Scientific Excellence • Resource Protection & Conservation • Benefits for Canadians
Excellence scientifique • Protection et conservation des ressources • Bénéfices aux Canadiens

Current Meter and Pressure Data Between Hamilton Bank and OWS Bravo, July 1987- August 1988

D.G. Wright, J.R.N. Lazier and M.J. Graça

Physical and Chemical Sciences Branch
Scotia-Fundy Region
Department of Fisheries and Oceans

Bedford Institute of Oceanography
P.O. Box 1006
Dartmouth, Nova Scotia
Canada B2Y 4A2

1991

Canadian Data Report of Hydrography and Ocean Sciences No. 96

Fisheries and Oceans Pêches et Océans

Canada

91-06356/

Canadian Data Report Of Hydrography and Ocean Sciences

Data reports provide a medium for the documentation and dissemination of data in a form directly useable by the scientific and engineering communities. Generally, the reports contain raw and or analyzed data but will not contain interpretations of the data. Such compilations commonly will have been prepared in support of work related to the programs and interests of the Ocean Science and Surveys (OSS) sector of the Department of Fisheries and Oceans.

Data reports are not intended for general distribution and the contents must not be referred to in other publications without prior written authorization from the issuing establishment. The correct citation appears above the abstract of each report. Data reports are abstracted in *Aquatic Sciences and Fisheries Abstracts* and indexed in the Department's annual index to scientific and technical publications.

Data reports are produced regionally but are numbered nationally. Requests for individual reports will be filled by the issuing establishment listed on the front cover and title page. Out of stock reports will be supplied for a fee by commercial agents.

Regional and headquarters establishments of Ocean Science and Surveys ceased publication of their various report series as of December 1981. A complete listing of these publications is published in the *Canadian Journal of Fisheries and Aquatic Sciences*, Volume 39: Index to Publications 1982. The current series, which begins with report number 1, was initiated in January 1982.

Rapport statistique canadien sur l'hydrographie et les sciences océaniques

Les rapports statistiques servent de véhicule pour la compilation et la diffusion des données sous une forme directement utilisable par les scientifiques et les techniciens. En général, les rapports contiennent des données brutes ou analysées, mais ne fournissent pas d'interprétation des données. Ces compilations sont préparées le plus souvent à l'appui de travaux liés aux programmes et intérêts du service des Sciences et levés océaniques (SLO) du ministère des Pêches et des Océans.

Les rapports statistiques ne sont pas destinés à une vaste distribution et leur contenu ne doit pas être mentionné dans une publication sans une autorisation écrite préalable de l'établissement auteur. Le titre exact paraît au-dessus du résumé de chaque rapport. Les rapports statistiques sont résumés dans la revue *Résumés des sciences halieutiques et aquatiques*, et ils sont classés dans l'index annuel des publications scientifiques et techniques du Ministère.

Les rapports statistiques sont produits à l'échelon régional, mais numérotés à l'échelon national. Les demandes de rapports seront satisfaites par l'établissement auteur dont le nom figure sur la couverture et la page du titre. Les rapports épuisés sont fournis contre rétribution par des agents commerciaux.

Les établissements des Sciences et levés océaniques dans les régions et à l'administration centrale ont cessé de publier leurs diverses séries de rapports en décembre 1981. Une liste complète de ces publications figure dans le volume 39, Index des publications 1982, du *Journal canadien des sciences halieutiques et aquatiques*. La série actuelle a commencé avec la publication du rapport numéro 1 en janvier 1982.

Canadian Data Report of

Hydrography and Ocean Sciences No. 96

1991

CURRENT METER AND PRESSURE DATA BETWEEN HAMILTON BANK AND OWS BRAVO, JULY 1987-AUGUST 1988

by

D.G. Wright, J.R.N. Lazier and M.J. Graça

Physical and Chemical Sciences Branch
Scotia-Fundy Region
Department of Fisheries and Oceans

Bedford Institute of Oceanography
P.O. Box 1006
Dartmouth, Nova Scotia
B2Y 4A2

ACKNOWLEDGMENTS

Helpful comments on a first draft were received from Brian Petrie and Fred Dobson. This project was partially supported by the Canadian Federal Panel on Energy Research and Development through PCS project no. 62129.

© Minister of Supply and Services 1991
Cat. No. FS 97-16/96E ISSN 0711-6721

Correct citation for this publication:

Wright, D.G., J.R.N. Lazier and M.J. Graça. 1991. Current meter and pressure data between Hamilton Bank and OWS Bravo, July 1987 - August 1988. Can. Data Rep. Hydrogr. Ocean Sci. No. 96: vii + 101 pp.

TABLE OF CONTENTS

	Page
Acknowledgements	ii
List of Tables	iv
List of Figures	v
Abstract/Résumé	vii
Introduction	1
Map of the Labrador Sea showing surface currents and mooring positions	6
Temperature, Salinity, and Density Sections	7
Pressure Gauge Locations	8
Pressure Gauge Station Identifications	8
Pressure Gauge Time Lines	9
Typical Pressure Records	10
Pressure Tidal Constituents	11
Low Pass Filter applied to all 1 hour data	14
Typical Pressure Spectra before detiding, after detiding, and after detiding and filtering	15
Pressure Information Summaries	16
Current Meter Locations	21
Current Meter Station Identifications	22
Current Meter Time Lines	23
Current Meter Tidal Constituents	24
Current Information Summaries	33

List of Tables

Page

Table 1 Pressure gauge identifications. Each instrument is identified by a station number and a nominal instrument depth. 8

Table 2 Tidal constituents determined from analysis of each of the pressure records. For each case, values were obtained from analysis of the full time series as well as from analysis of individual 29 day blocks. Results of the analysis of the longest block are quoted with the standard deviation of the 29-day analyses to give some idea of the temporal variability of results. Phases are in GMT. 1MB = 0.1kPa. 11

Table 3 Current meter identifications. Each instrument is identified by a station number and a nominal instrument depth. 22

Table 4 Tidal constituents determined from analysis of each of the current meter records. U and V are the eastward and northward velocity components, respectively. For each case, values were obtained from analysis of the full time series as well as from analysis of individual 29 day blocks. Results of the analysis of the full series are quoted with the standard deviation of the 29-day analyses to give some idea of the temporal variability of results. Phases are in GMT. 24

List of Figures

Page

Figure 1 The mean surface circulation in the Labrador Sea indicated by broad arrows for the main currents and narrow arrows for the weaker currents. The CTD line with mooring positions runs across Hamilton Bank on the continental shelf to the centre of the Sea. The first mooring number at each site is for the current meter mooring; the second is the pressure gauge mooring. 6

Figure 2 Potential temperature, salinity and σ_θ obtained between August 3 and 9, 1988 from CSS Dawson along the mooring line showing positions of the current meters (●) and pressure gauges (+). Mooring numbers for the current meters are indicated along the top and for the pressure gauges along the bottom. 7

Figure 3 Location map for pressure gauges moored over the shelf during the 1987/88 field year. Isobaths are indicated by (·····) 200 m, (— — —) 1000 m, and (— —— —) 3000 m. 8

Figure 4 Time intervals during which each of the pressure gauges returned useful information. 9

Figure 5 Three typical pressure records from stations across the shelf and slope (onshore to offshore). Refer to Fig. 3 for station locations. 10

Figure 6 Filter applied to 1 hour data before decimating to a six hour sampling interval. This filter was applied to both pressure and current meter data. 14

Figure 7 Typical spectra of the pressure records: (a) before detiding, (b) after detiding, and (c) after detiding and filtering. Power density is given in units of decibars squared/cycle per hour. 15

Figure 8 Plots of the data obtained from each of the pressure gauges. Figures include a time series plot, an auto-spectrum and a location map. 16

Figure 9 Locations of current meter moorings during the 1987/88 field year. Isobaths are indicated by (·····) 200 m,

(– – – –) 1000 m, and (— —— —) 3000 m. 21

Figure 10 Time intervals during which each of the current meters returned useful data. 23

Figure 11 Residual data for each of the current meters moored between Hamilton Bank and OWS Bravo during the 1987/88 field year. Information includes a location plot, basic statistics, rotary spectrum, various time series plots of the current data, temperature, salinity and σ_θ time series, and progressive vector diagrams. 33

ABSTRACT

Wright, D.G., J.R.N. Lazier and M.J. Graça. 1991. Current meter and pressure data between Hamilton Bank and OWS Bravo, July 1987 - August 1988. Can. Data Rep. Hydrogr. Ocean Sci. No. 96: vii + 101 pp.

From July 1987 to August 1988 an array of four pressure gauges and nineteen current meters was moored along a line extending across Hamilton Bank and out to the center of the Labrador Sea. Temperature and salinity observations were collected along this section during the deployment and recovery cruises. The aim of this field program was to provide the data required to estimate the mean value and temporal variations of the transport through this section. This report presents the data as sections of temperature, salinity, and density, tidal constituents for pressure and currents, spectra of pressure and current variations, progressive vector diagrams and 'stick plots' of low-pass filtered currents, and time series plots of low-pass filtered pressure, temperature, salinity, density, and current components. Residual currents are presented in east-west/north-south as well as major/minor axis coordinate systems and basic statistics are briefly summarized for each.

RÉSUMÉ

Wright, D.G., J.R.N. Lazier and M.J. Graça. 1991. Current meter and pressure data between Hamilton Bank and OWS Bravo, July 1987 - August 1988. Can. Data Rep. Hydrogr. Ocean Sci. No. 96: vii + 101 pp.

Entre juillet 1987 et août 1988, quatre manomètres et dix-neuf courantomètres ont été ancrés le long d'une ligne qui traverse le banc Hamilton jusqu'au milieu de la mer Labrador. Des observations de température et de salinité ont été faites le long de cette ligne pendant les sorties de déploiement et de récupération. Le but de ce programme sur le terrain était de fournir les données requises pour estimer la valeur moyenne et les variations temporelles du transport dans cette section. Le présent rapport renferme les données sous forme de sections de température, de salinité et de masse volumique, de composantes de pression et de courants dues aux marées, de spectres de variations de pression et de courant, de diagrammes vectoriels progressifs et d'"histogrammes" des courants filtrés passe-bas, et de tracés de séries chronologiques de composantes passe-bas de pression, de température, de salinité, de masse volumique et de courant. Les courants résiduels sont présentés dans des systèmes de coordonnées à axes est-ouest/nord-sud et à grand/petit axes, et des statistiques de base sont présentées sommairement pour chacun des systèmes.

INTRODUCTION

The current meter and pressure gauge records contained in this report were obtained in a section extending across the Labrador continental shelf and slope and out to the center of the Labrador Sea between late July 1987 and early August 1988. The purpose of the program was to record pressure variations at the bottom and representative currents throughout the section over one year, with CTD observations along the line when the moorings were placed and recovered. The ultimate aim is to use these data to estimate the transport perpendicular to the section including all the flows over the continental shelf, the slope, and the deep ocean, from the coast out to the centre of the Labrador Sea.

The locations of the moorings are shown in Fig. 1 along with a sketch of the near surface currents in the Labrador Sea based on the dynamic topography (Smith et al, 1937; Lazier, 1973) and drifter trajectories (Peterson and Symonds, 1988). There are three strong currents dominating the circulation in the Labrador Sea. The West Greenland Current enters the Sea around Cape Farewell, the southern tip of Greenland, and flows north along the west coast of Greenland. The current transports two main water masses: i) cold (0°C), low-salinity (33) water over the continental shelf, which originates in the Arctic Ocean and the Greenland Sea and enters the region through Denmark Strait in the East Greenland Current; and ii) the relatively warm (5°C), saline (35) water over the slope, which comes from the Irminger Sea. The strongest part of the Current is coincident with the high horizontal gradients between these two water masses.

The main features of the Labrador Current are illustrated in Fig. 2 and are similar to those of the West Greenland Current. The cold low-salinity water over the continental shelf has uniformly small horizontal gradients except in the upper layers near the coast where salinity and, consequently, σ_θ decrease because of the local freshwater runoff. At the outer edge of the continental shelf, the cold

low-salinity water gives way to the warmer, more saline oceanic water. In the transition between the two water masses, temperature changes at a fixed depth from -1 to +3°C and salinity increases from 33 to 34.5. As in the West Greenland Current, this transition marks the strongest part of the baroclinic current. The remnants of the Irminger water which enters the sea in the West Greenland Current can be seen in the temperature section as the slight temperature maximum (T>3.6°C) between 300 and 700 m, next to the continental slope.

The North Atlantic Current is the most northerly branch of the Gulf Stream and forms the southern boundary of the Labrador Sea. The greatest portion of this flow changes direction from northwestward to eastward near 53°N 46°W in what is commonly called the Northwest Corner. North Atlantic Current water is much warmer (14°C) and saltier (35.7) than in any of the other flows in the Labrador Sea. The influence of this current extends further north and west to about 55°N, 50°W where the remaining northwestward flow turns eastward along with an eastward branch of the Labrador Current. In the central part of the Labrador Sea, the currents are generally weak and cyclonic.

The mooring line was positioned to cross the Labrador Current where it was thought to be strongest, and to avoid the influences of the North Atlantic Current south of 54°N, and the region near 55°N where the eastward offshore currents originate.

The oceanographic features monitored by each current meter are clear in Fig. 2. The shallowest mooring (number 836), in 190 m of water over the continental shelf, had one bottom pressure gauge and one current meter approximately 5 m off the bottom. This current meter sampled the bottom of the inshore branch of the Labrador Current which flows southward to the west of Hamilton Bank. Over the 1000 m isobath, current meters were placed at 200 m, 400 m and near the bottom to monitor the main flow of the offshore branch of the Current. The pressure gauges at this and all the other deep water locations were placed on moorings separate from the current meters. This is required because the pressure gauges are fitted loosely into the mooring anchors and may fall out if they were at the bottom of a string of current

meters which when released from the ship are horizontal rather than vertical. Current meters were not placed near the surface over the shelf or upper slope because of the potential for loss due to icebergs.

Over the 2500 m isobath, current meters were placed at 100 m, 400 m and 1000 m to expand the monitoring of the upper part of the Labrador Current toward the east. The mooring also had current meters at approximately 15 m and 315 m off the bottom to monitor the near bottom currents and shear. The best known current at these depths is readily identified by the sloping isopleths near the bottom. This is the Denmark Strait Overflow or Western Boundary Undercurrent which flows over the Denmark Strait and down to the bottom of the ocean following the isobaths around the Labrador Sea. The other current to be monitored at these depths is the barotropic flow expected over the continental slope. This is the return flow to the south of the northward Sverdrup transport in the Subpolar gyre. Its transport has been estimated to be in the neighbourhood of $30\times10^{6}m^{3}s^{-1}$, much greater than the estimates of $5\text{-}10\times10^{6}m^{3}s^{-1}$ calculated for the baroclinic portion of the Labrador Current using dynamic topography.

The outer two moorings have five current meters each, with three instruments below 2000 m to monitor the Denmark Strait Overflow. The upper meters were placed about 50 m below the surface to record the seasonal changes in the temperature and salinity of the mid-ocean mixed layer and monitor the currents. The instruments at 1000 m are located in the middle of the region noted for low horizontal and vertical property gradients. The Labrador Sea Intermediate Water is formed in this area via deep convective mixing in mid-winter.

The 19 current meters were successfully moored between July 27 and 31, 1987 from CSS Dawson on cruise number 87-026. All the pressure gauge moorings were also placed successfully except number 839 which for some unknown reason did not respond to any acoustic command after it was released from the ship. All the moorings except 839 were recovered between August 3 and 9 from CSS Dawson on cruise 88-025.

Pressure gauge data are presented between pages 8 and 20. Mooring

locations and durations are indicated in Figure 3 and Table 1. The data were initially processed through the standard despiking routines, and Figure 4 shows the intervals of good data determined after this process. From this figure it is clear that two of the recovered gauges yielded complete records while the other two are less than half complete. A sample of the raw pressure data at three of the moorings between day 250 and 270 in 1987 (Fig. 5) illustrates the dominant tidal signal and the high coherence between the records.

Tidal parameters were determined using the standard BIO tidal analysis package. The results of an analysis of each full record are presented in Table 2. Standard deviations between the non-overlapping 29 day blocks which constitute each record are also given in Table 2 to give an idea of the temporal variability of the tides. The tidal constituents based on the 29-day analyses were subtracted from the raw data and the filter illustrated in Fig. 6 was applied to the results to obtain the final residual data set. The spectra of one record at the different stages of this process are shown in Fig. 7. On the left the spectra of the raw data shows that the overwhelming amount of energy in the signal is in the tidal bands at ≈0.08cph and ≈0.04cph. After the tidal constituents are subtracted (middle spectrum) the energy density in the semi-diurnal band is reduced to about 2% of its original value, however the spectrum is still dominated by the tidal bands. This residual energy is thought to be associated with the baroclinic tide which is excited where the barotropic tide encounters depth variations. The two tidal signals are not necessarily in phase and the baroclinic signal is not completely removed when the tidal constituents are subtracted. After the remaining tidal energy was removed with the low-pass filter illustrated in Fig. 6, the spectra appeared as on the right in Fig. 7.

Time series plots and spectra of each of the detided and filtered pressure gauge records are shown in Fig. 8. All the records have maximum energy at the lowest frequencies. The only record without problems appears to be from mooring 836 at 194 m over the shelf. Number 837 at 1000 m starts drifting badly after about 100 days and stops completely after another 40 days. The record at 2500 m apparently has a linear

drift through the whole record. This drift is probably due to internal drift in the instrument, but steady sinking into the mud cannot be conclusively ruled out. The final record (840) didn't start recording sensible data until it had been in the water 220 days.

Current meter data are presented following Fig. 9 and Table 3 (pages 21 and 22) which show the mooring locations and record durations. The lengths of the useful records plotted in Fig. 10 emphasize the poor too short to be useful and only 10 of the remaining 17 records are complete. Of the other 7, 2 lasted less than 100 days, 3 kept working for 150 to 200 days and 2 quit about 40 days short of the maximum 372 days. The useful current meter records were treated in the same way as the pressure data, i.e., despiking followed by determination of the tidal constituents which are then subtracted from the raw data to produce a residual file which is then filtered with the low pass filter (Fig. 6).

The tidal constituents for each current meter record are listed in Table 4 followed by the plots for each of the 17 useful current meter records (Fig. 11). For each record the summary statistics are presented along with a small map showing the location of the instrument and a rotary spectrum. These are followed by time series plots of temperature, salinity, σ_θ, current vectors (stick plots), various velocity components and progressive vector diagrams. To avoid excessive crowding on the stick plots, the data were filtered with a box-car filter with a width of 5 data values, and decimated from six-hourly to daily data before plotting. All time series plots of currents have means removed and the means are given in the immediately preceding table of statistics.

REFERENCES

Lazier J.R.N. (1973) The renewal of Labrador Sea Water. *Deep-Sea Research*, 20, 341-353.

Peterson I. and G. Symonds (1988) Ice flow trajectories off Labrador and eastern Newfoundland: 1985-1987. Canadian Technical Report of Hydrography and Ocean Sciences No. 104, v + 101p. Bedford Institute of Oceanography.

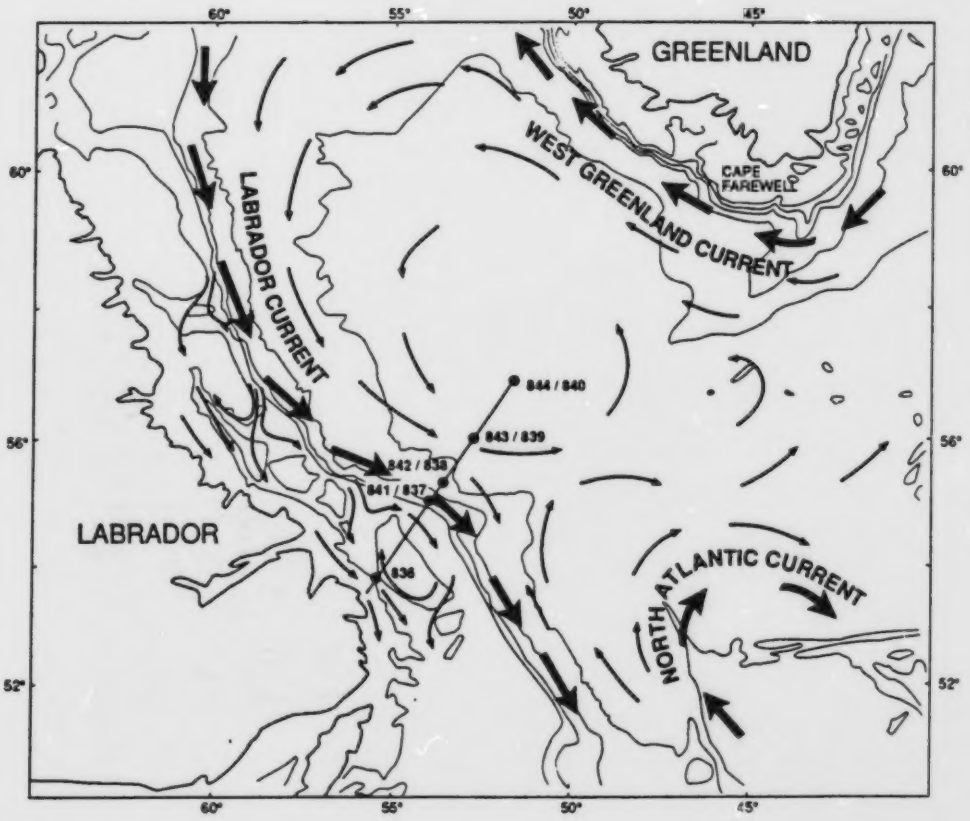


Figure 1. The mean surface circulation in the Labrador Sea indicated by broad arrows for the main currents and narrow arrows for the weaker currents. The CTD line with mooring positions runs across Hamilton Bank on the continental shelf to the centre of the Sea. The first mooring number at each site is for the current meter mooring; the second is the pressure gauge mooring.

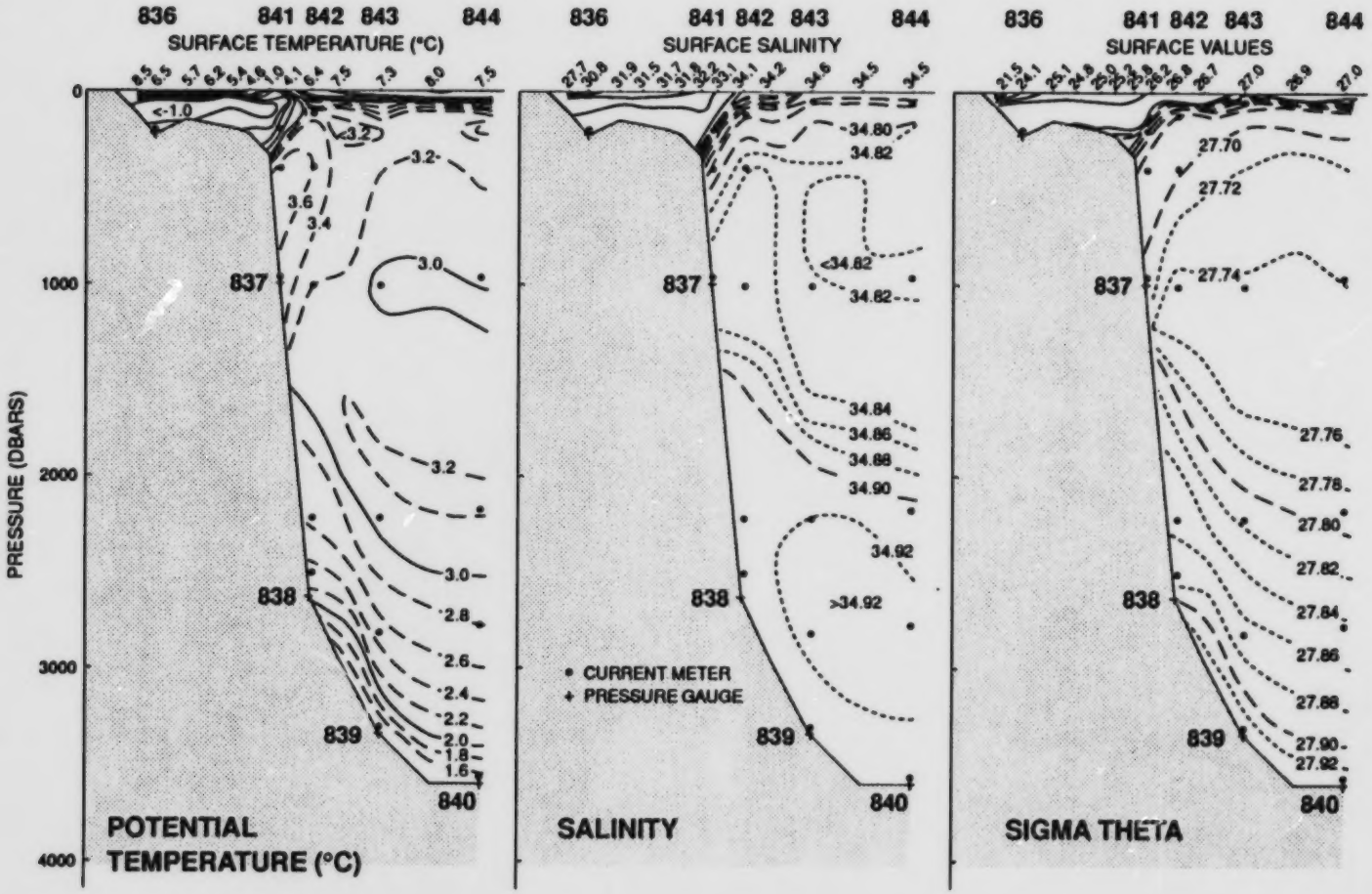


Figure 2. Potential temperature, salinity and σ_θ obtained between August 3 and 9, 1988 from CSS Dawson along the mooring line showing positions of the current meters (●) and pressure gauges (+). Mooring numbers for the current meters are indicated along the top and for the pressure gauges along the bottom.

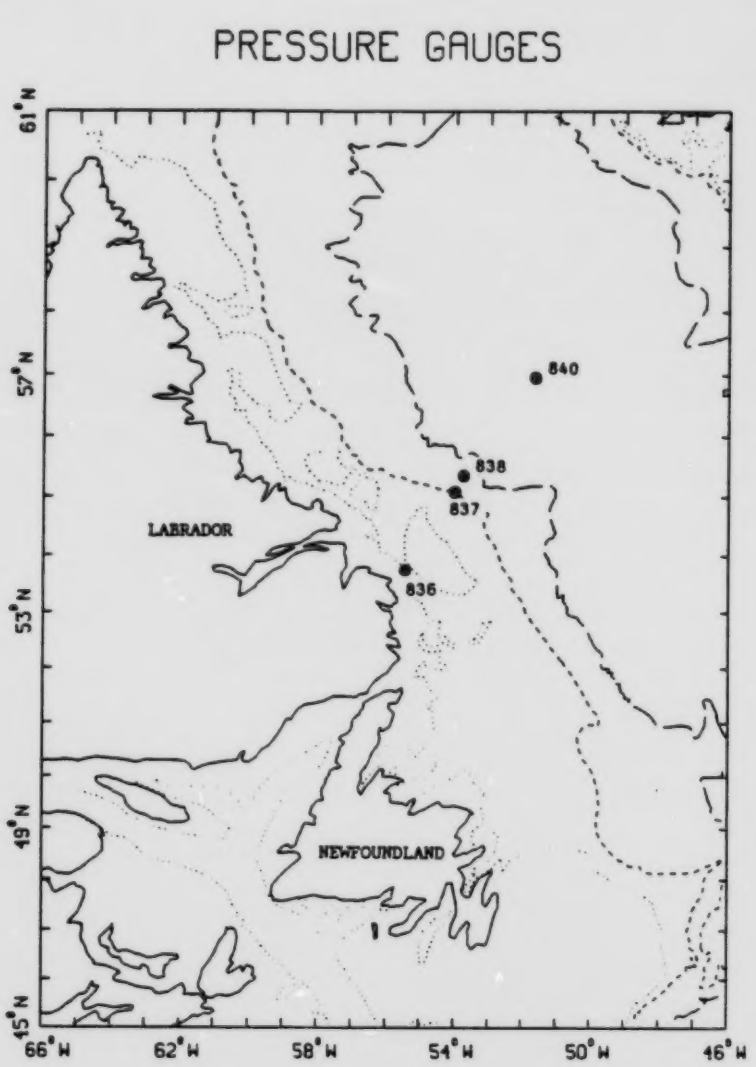
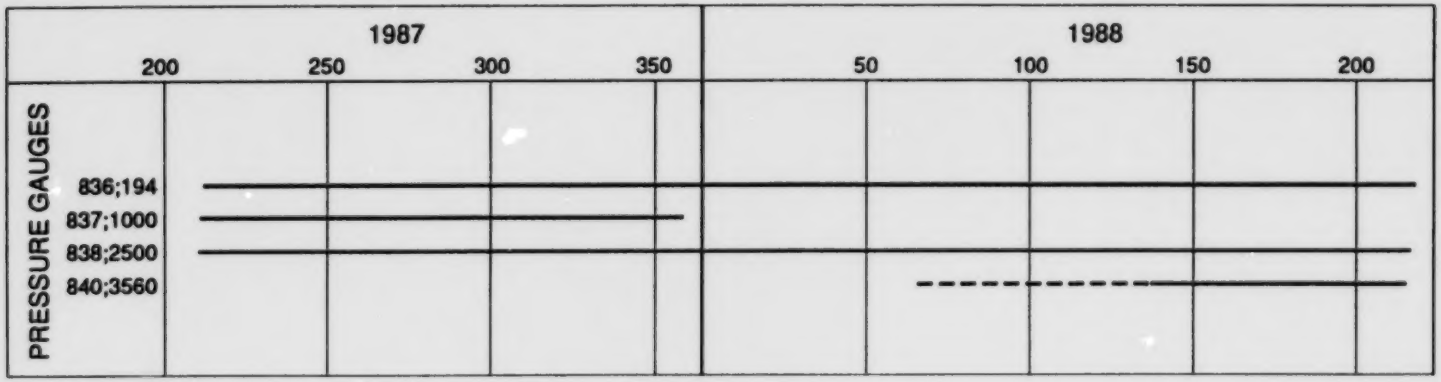


Figure 3. Location map for pressure gauges moored over the shelf during the 1987/88 field year. Isobaths are indicated by (·····) 200 m, (- - - -) 1000 m, and (———) 3000 m.

STATION	INSTR. TYPE	SAMPLING RATES (SEC)	LAT.	LONG.	WATER DEPTH (M)	START DATE	LENGTH (DAYS)
(836; 194.M.)	WLR5	3600	53.74N	55.46W	194	31/7/87	372
(837; 1000.M.)	WLR5	3600	55.08N	54.01W	1000	30/7/87	148
(838; 2500.M.)	WLR5	3600	55.35N	53.76W	2500	29/7/87	372
(840; 3560.M.)	WLR5	3600	56.96N	51.65W	3560	5/3/88	151

Table 1. Pressure gauge identifications. Each instrument is identified by a station number and a nominal instrument depth.

Figure 4. Time intervals during which each of the pressure gauges returned useful information.



The broken line for gauge 840;3560 indicates a time interval during which data return was very intermittent: longest gap - 7 hrs.
longest data block - 479 hrs.

HAMILTON BANK PRESSURES / WEST TO EAST

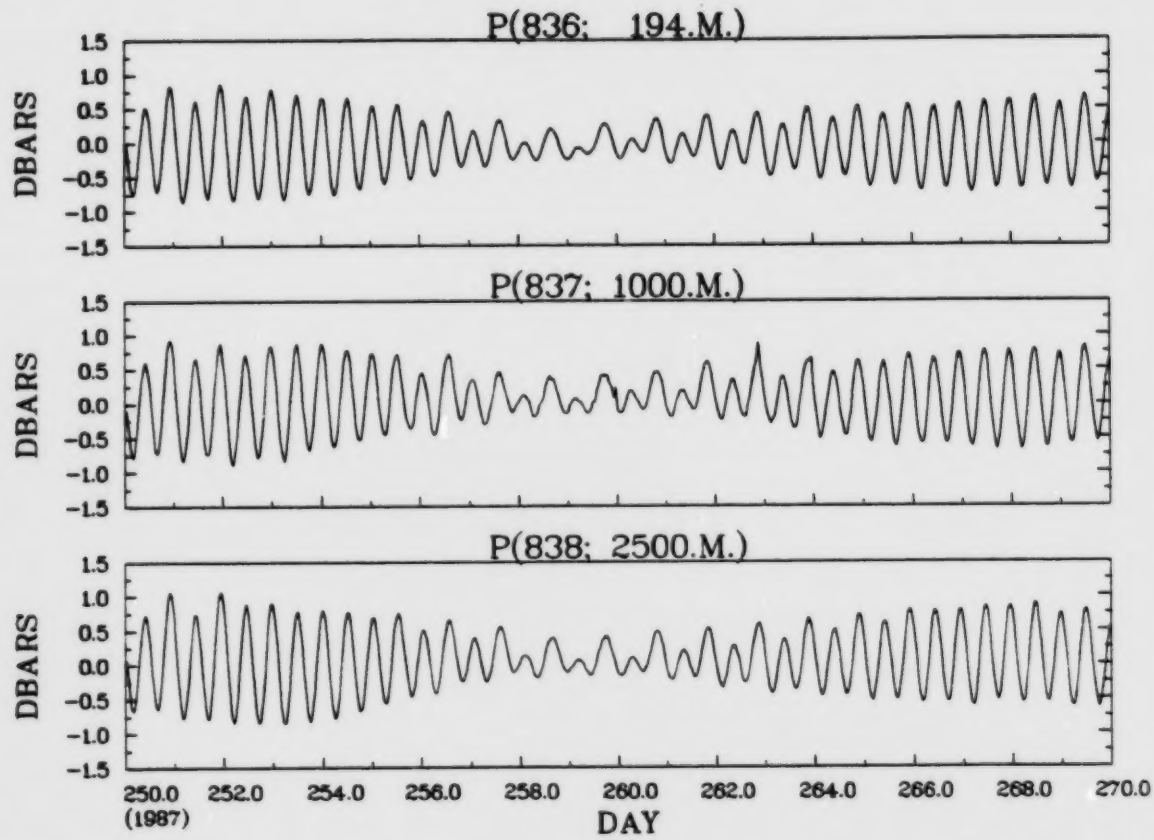


Figure 5. Three typical pressure records from stations across the shelf and slope (onshore to offshore). Refer to Fig. 3 for station locations.

Table 2

Tidal constituents determined from analysis of each of the pressure records. For each case, values were obtained from analysis of the full time series as well as from analysis of individual 29 day blocks. Results of the analysis of the longest block are quoted with the standard deviation of the 29-day analyses to give some idea of the temporal variability of results. Phases are in GMT. 1MB = 0.1kPa.

CONSTITUENT M2

STATION	# BLOCKS	AMPLITUDE(MB)	PHASE(DEG)
P(836; 194.M.)	13	45.40(+/- 1.29)	307.5(+/- 1.2)
P(837; 1000.M.)	5	48.30(+/- 0.50)	297.5(+/- 0.6)
P(838; 2500.M.)	13	50.80(+/- 1.18)	294.9(+/- 1.6)
P(840; 3560.M.)	5	56.10(+/- 1.36)	285.6(+/- 1.7)

CONSTITUENT S2

STATION	# BLOCKS	AMPLITUDE(MB)	PHASE(DEG)
P(836; 194.M.)	13	18.00(+/- 0.92)	318.3(+/- 2.6)
P(837; 1000.M.)	5	16.00(+/- 0.41)	336.0(+/- 1.7)
P(838; 2500.M.)	13	19.70(+/- 0.73)	308.1(+/- 1.7)
P(840; 3560.M.)	5	22.60(+/- 1.68)	341.3(+/- 2.4)

CONSTITUENT N2

STATION	# BLOCKS	AMPLITUDE(MB)	PHASE(DEG)
P(836; 194.M.)	13	10.30(+/- 1.38)	289.2(+/- 8.5)
P(837; 1000.M.)	5	9.60(+/- 1.58)	278.7(+/- 10.4)
P(838; 2500.M.)	13	11.20(+/- 1.19)	275.1(+/- 7.1)
P(840; 3560.M.)	5	11.50(+/- 1.19)	263.3(+/- 11.9)

CONSTITUENT K1

STATION	# BLOCKS	AMPLITUDE(MB)	PHASE(DEG)
P(836; 194.M.)	13	9.70(+/- 0.42)	143.8(+/- 2.7)
P(837; 1000.M.)	5	12.90(+/- 1.50)	178.0(+/- 3.9)
P(838; 2500.M.)	13	10.20(+/- 0.50)	148.4(+/- 2.7)
P(840; 3560.M.)	5	10.80(+/- 1.00)	173.6(+/- 6.9)

CONSTITUENT O1

STATION	# BLOCKS	AMPLITUDE(MB)	PHASE(DEG)
P(836; 194.M.)	13	6.30(+/- 0.38)	120.5(+/- 2.2)
P(837; 1000.M.)	5	7.60(+/- 0.57)	127.5(+/- 4.2)
P(838; 2500.M.)	13	7.50(+/- 0.29)	124.8(+/- 4.8)
P(840; 3560.M.)	5	7.20(+/- 0.55)	120.1(+/- 8.6)

CONSTITUENT M4

STATION	# BLOCKS	AMPLITUDE(MB)	PHASE(DEG)
P(836; 194.M.)	13	0.40(+/- 0.08)	286.6(+/- 11.6)
P(837; 1000.M.)	5	0.30(+/- 0.22)	223.7(+/-136.5)
P(838; 2500.M.)	13	0.20(+/- 0.10)	287.3(+/- 57.3)
P(840; 3560.M.)	5	0.20(+/- 0.39)	62.1(+/-120.4)

CONSTITUENT MS4

STATION	# BLOCKS	AMPLITUDE(MB)	PHASE(DEG)
P(836; 194.M.)	13	0.20(+/- 0.09)	28.8(+/- 40.7)
P(837; 1000.M.)	5	0.10(+/- 0.18)	105.2(+/- 73.1)
P(838; 2500.M.)	13	0.10(+/- 0.09)	322.2(+/- 90.5)
P(840; 3560.M.)	5	0.30(+/- 0.50)	60.1(+/- 60.8)

CONSTITUENT MF

STATION	# BLOCKS	AMPLITUDE(MB)	PHASE(DEG)
P(836; 194.M.)	13	0.90(+/- 0.76)	202.9(+/- 64.1)
P(837; 1000.M.)	5	1.70(+/- 1.48)	227.3(+/- 35.8)
P(838; 2500.M.)	13	1.70(+/- 1.41)	197.8(+/-107.5)
P(840; 3560.M.)	5	2.60(+/- 1.00)	201.6(+/- 37.4)

FILTER APPLIED TO 1HR PRESSURE DATA BEFORE DECIMATING TO 6HR

FILTER IS A CARTWRIGHT LOWPASS FILTER OF 97 WEIGHTS
CUTOFF FREQ. IS .03645833 CPH
AMPLITUDE RESPONSE MARKED BY #
PHASE RESPONSE MARKED BY P

POWER PASSED (%)

```
0.....20.....40.....60.....80.....100.   FREQ(CPH)     RESPONSE
<          .     .     .     P     #.    .3174E-02    99.84509
<          .     .     .     P     #.    .4150E-02    99.76126
<          .     .     .     P     #.    .5127E-02    99.68304
<          .     .     .     P     #.    .6104E-02    99.62668
<          .     .     .     P     #.    .7324E-02    99.61452
<          .     .     .     P     #.    .8789E-02    99.71406
<          .     .     .     P     #.    .1025E-01    99.96771
<          .     .     .     P      #    .1196E-01   100.45793
<          .     .     .     P      #    .1392E-01   101.18448
<          .     .     .     P      #    .1611E-01   101.82591
<          .     .     .     P      #    .1880E-01   101.56739
<          .     .     .     P     # .   .2222E-01    97.35886
<          .     .     .     0     .    .2686E-01    80.92726
<          .     #     .     P     .    .3345E-01    41.65048
<#         .     .     .     P     .    .4517E-01     2.49307
#          .     .     .     P     .    .6860E-01      .00029
#          .     .     .     P     .    .1155E+00      .00000
#          .     .     .     P     .    .2092E+00      .00000
#          .     .     .     P     .    .3857E+00      .00000
-180...-135 .....-90 .....-45.....0.....45.
```

Figure 6. Filter applied to 1 hour data before decimating to a six hour sampling interval. This filter was applied to both pressure and current meter data.

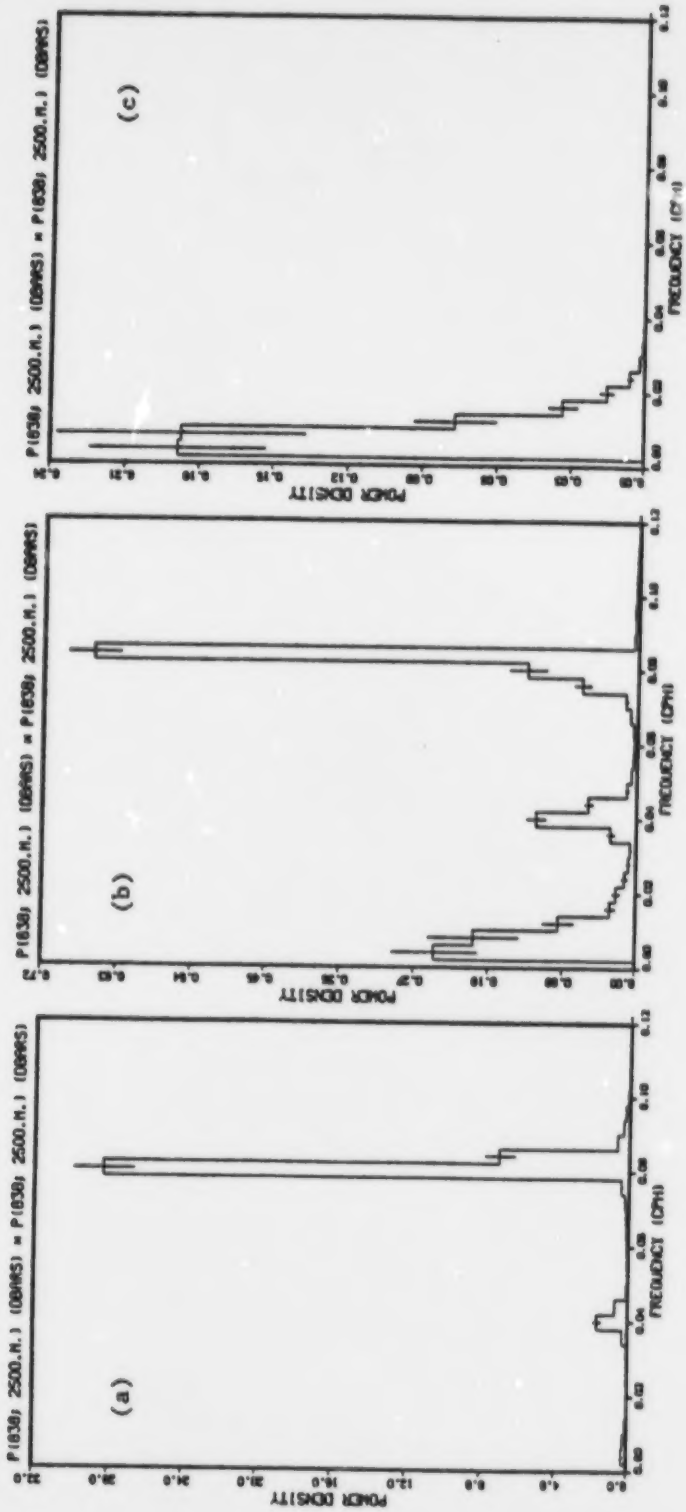
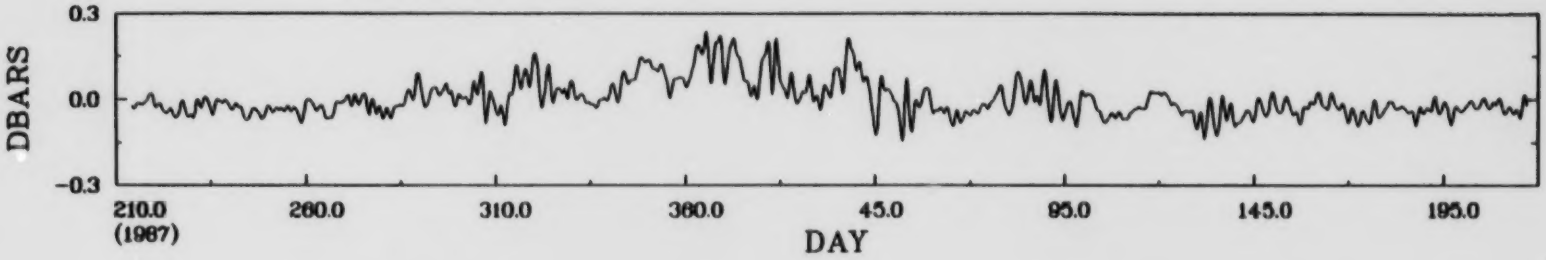
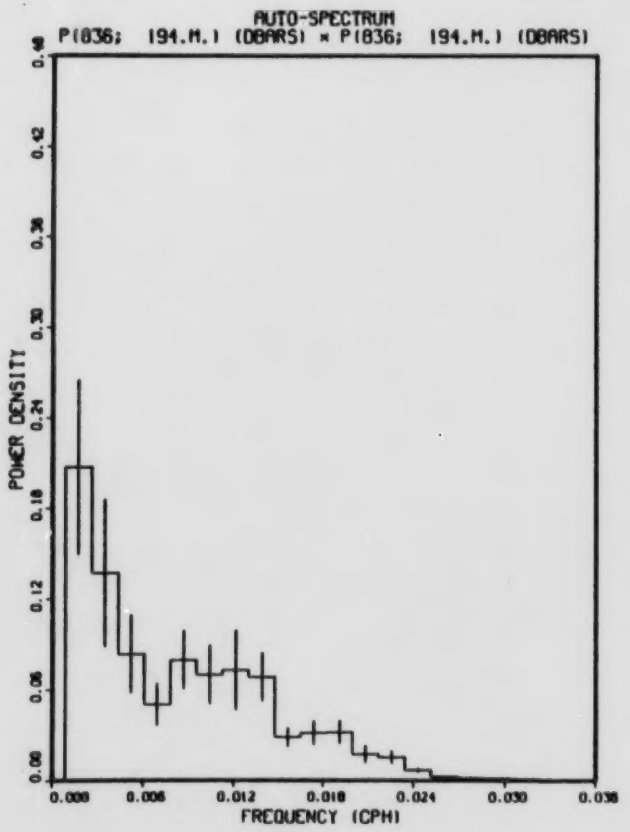


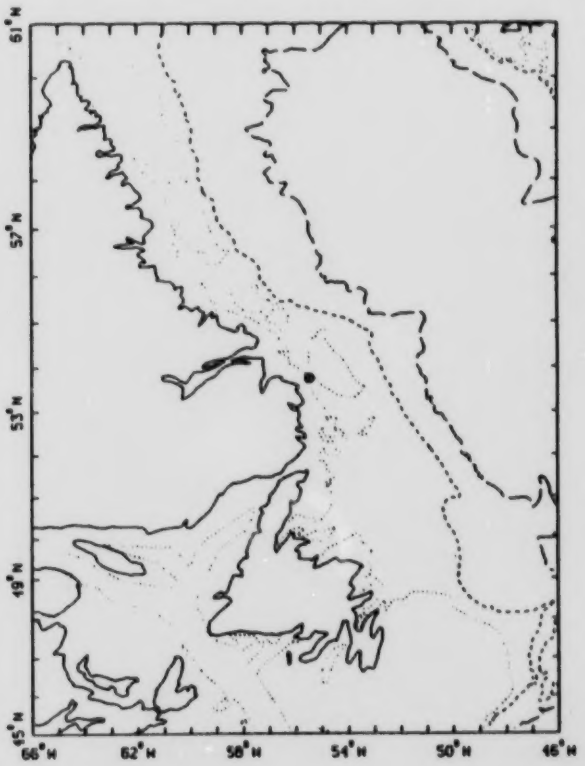
Figure 7. Typical spectra of the pressure records: (a) before detiding, (b) after detiding, and (c) after detiding and filtering. Power density is given in units of decibars squared/cycle per hour.

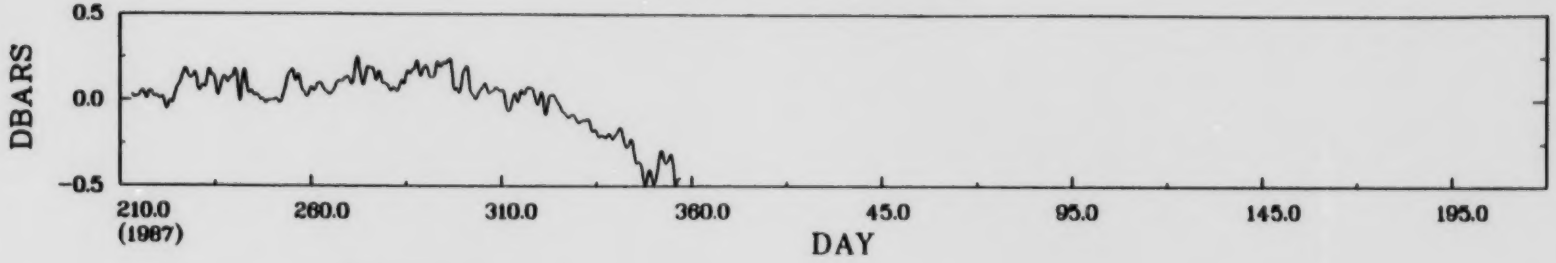
Figure 8. Plots of the data obtained from each of the pressure gauges. Figures include a time series plot, an auto-spectrum and a location map.

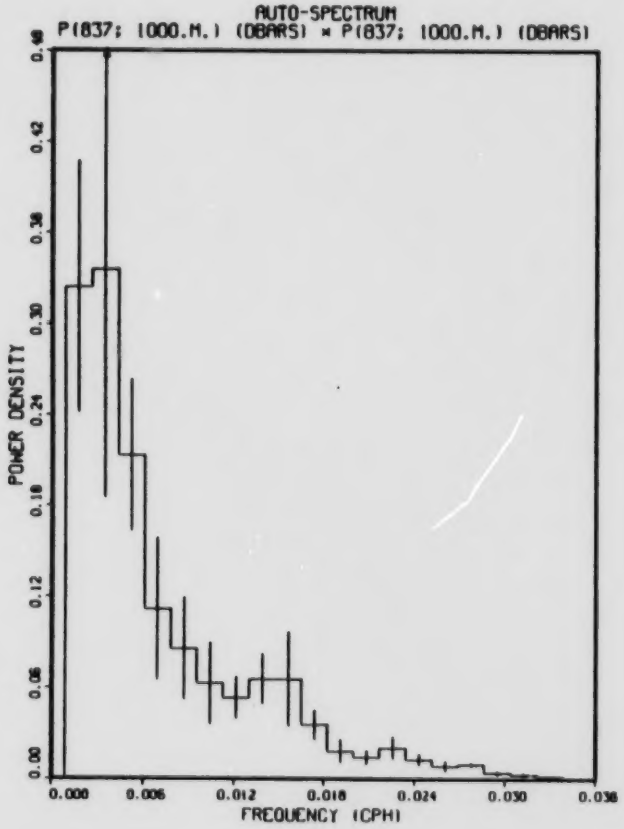
P(836; 194M) - RESIDUALS
POSITION 53.742 N 55.462 W

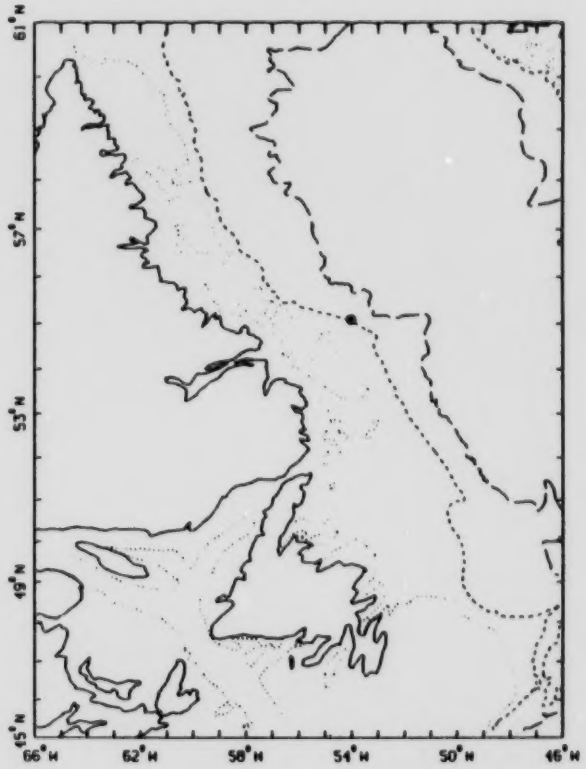




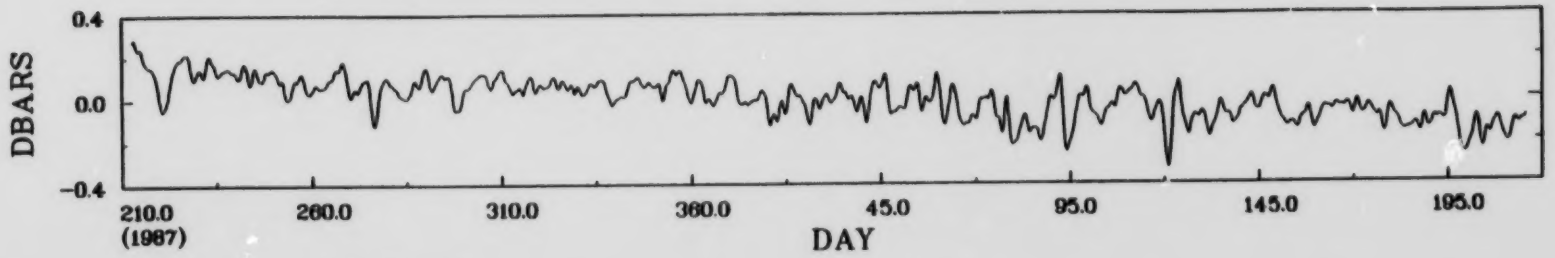


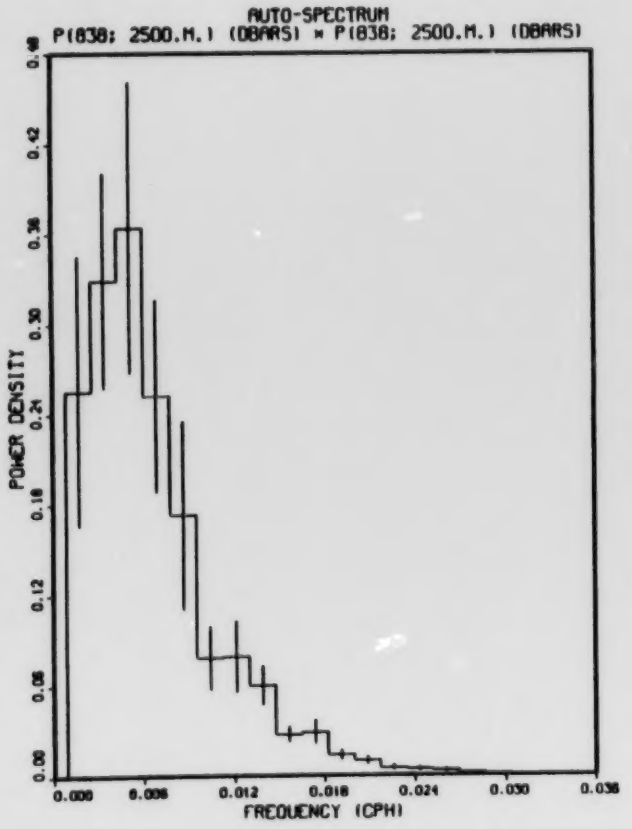

P(837;1000M) - RESIDUALS
POSITION 55.078 N 54.008 W
DBARS
0.5
0.0
-0.5
210.0
(1987)
260.0
310.0
360.0
45.0
95.0
145.0
195.0
DAY

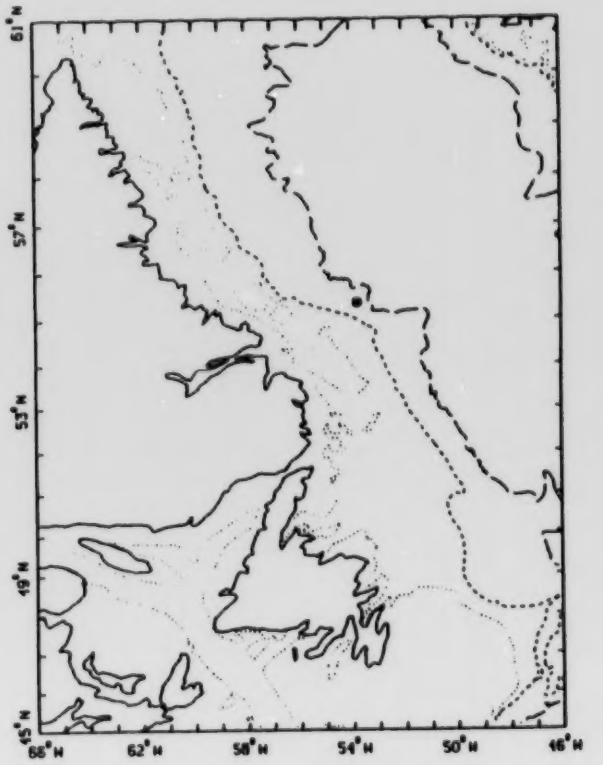

AUTO-SPECTRUM
P(837; 1000.M.) (DBARS) * P(837; 1000.M.) (DBARS)
POWER DENSITY
0.00
0.06
0.12
0.18
0.24
0.30
0.36
0.42
0.48
0.000
0.006
0.012
0.018
0.024
0.030
0.036
FREQUENCY (CPH)


61°N
57°N
53°N
49°N
45°N
66°W
62°W
58°W
54°W
50°W
46°W

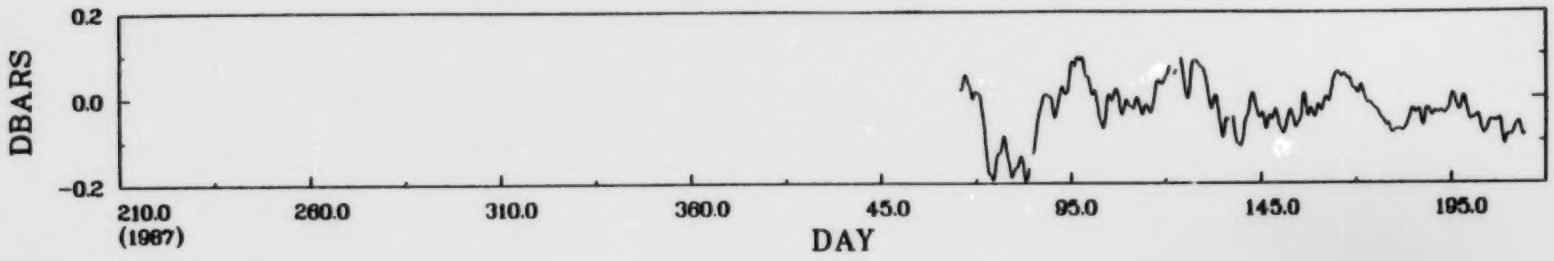
P(838;2500M) – RESIDUALS
POSITION 55.355 N 53.761 W

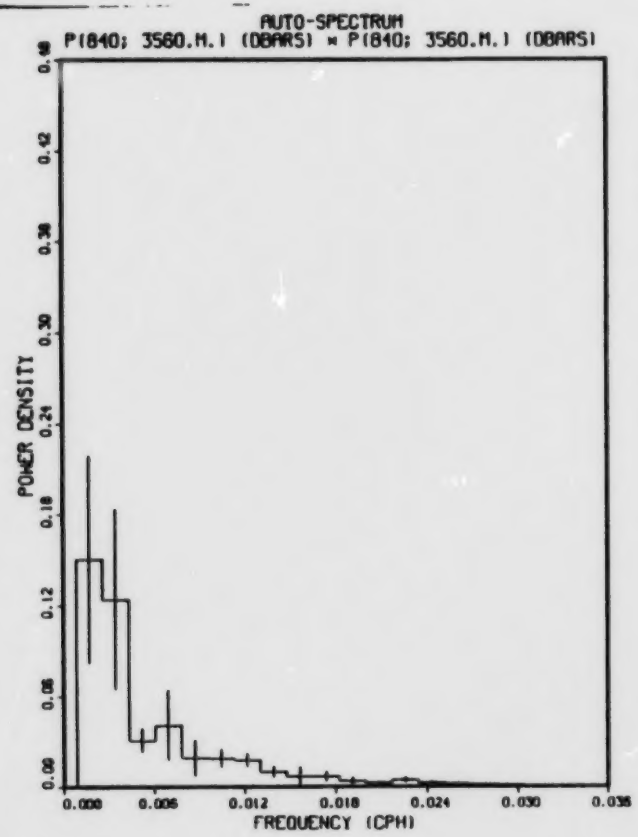


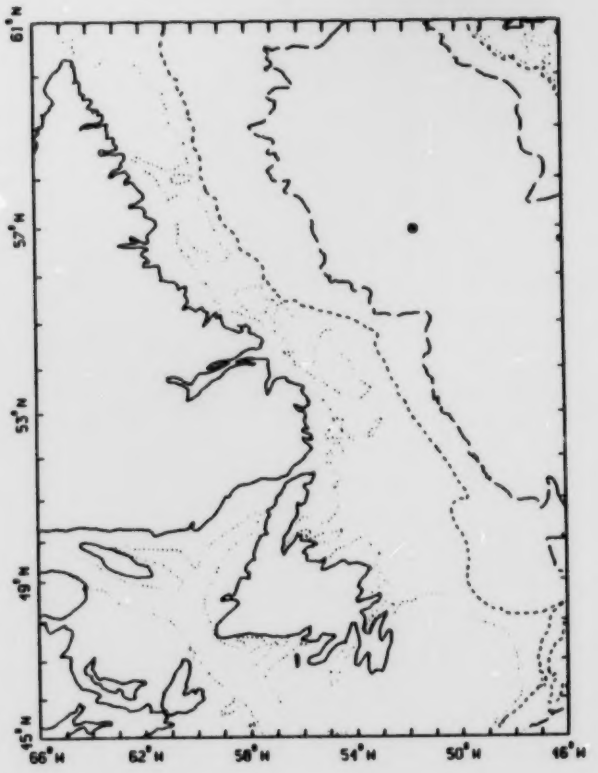




P(840;3560M) - RESIDUALS
POSITION 56.956 N 51.647 W







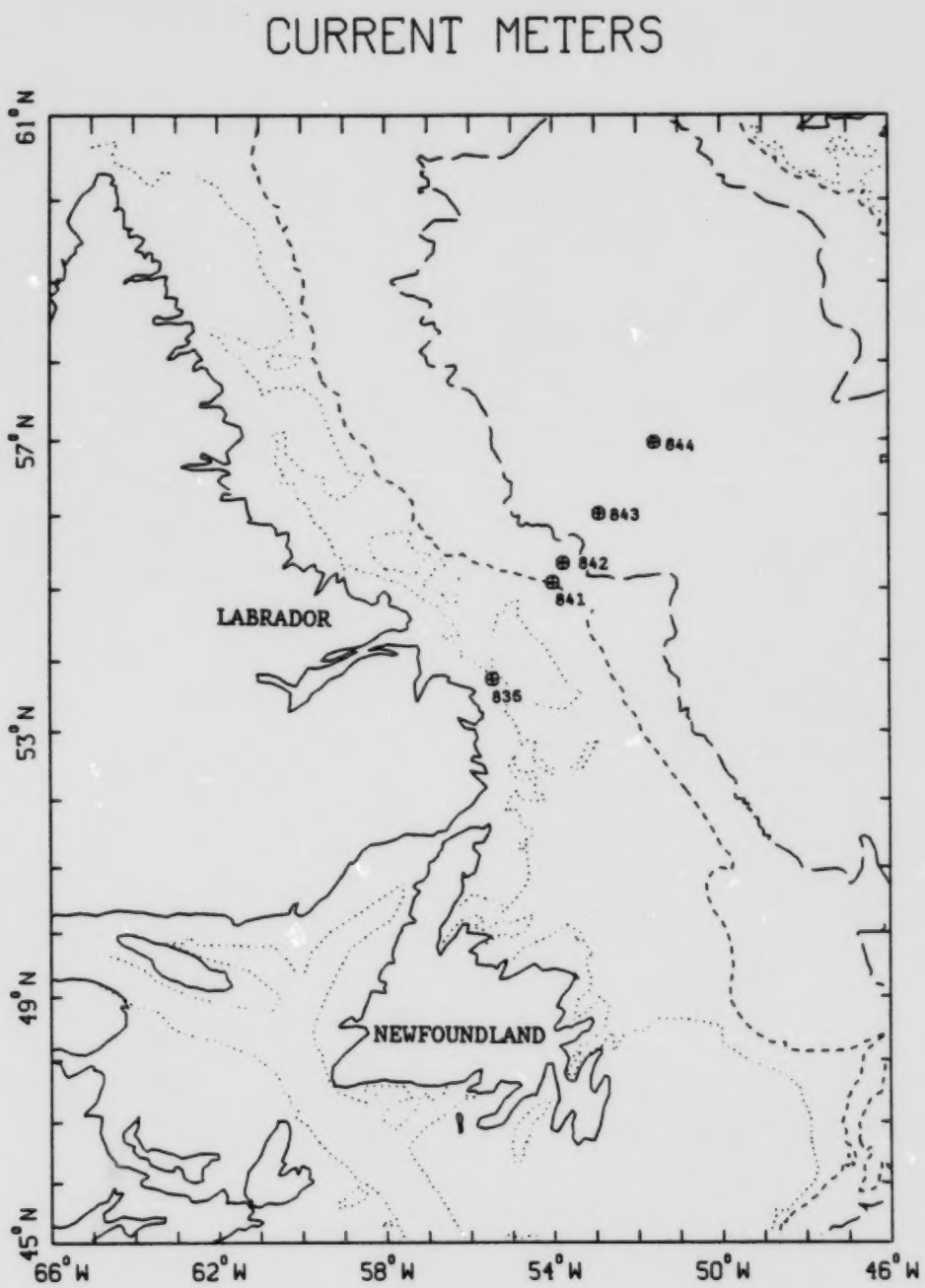


Figure 9. Locations of current meter moorings during the 1987/88 field year. Isobaths are indicated by (·····) 200 m, (- - - -) 1000 m, and (— — —) 3000 m.

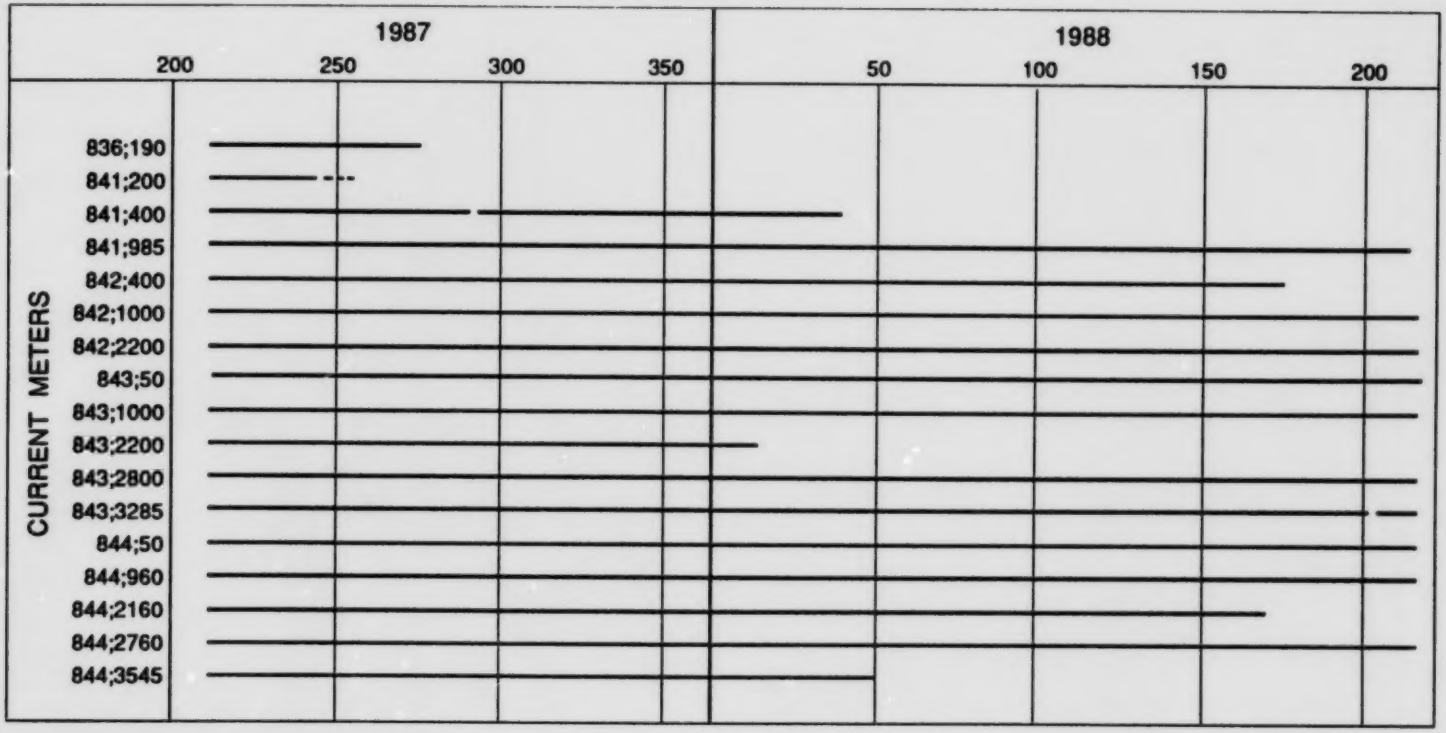
CURRENT METERS

STATION	INSTR. TYPE	SAMPLING RATES (SEC)	LAT.	LONG.	WATER DEPTH (M)	START DATE	LENGTH (DAYS)
(836., 190.M.)	RCM	3600	53.74N	55.46W	194	31/7/87	64
(841., 200.M.)	RCM	3600	55.08N	54.01W	1000	30/7/87	45
(841., 400.M.)	RCM	3600	55.08N	54.01W	1000	30/7/87	194
(841., 985.M.)	RCM	3600	55.08N	54.01W	1000	30/7/87	368
(842., 400.M.)	RCM	3600	55.35N	53.76W	2500	29/7/87	349•
(842.,1000.M.)	RCM	3600	55.35N	53.76W	2500	29/7/87	372
(842.,2200.M.)	RCM	3600	55.35N	53.76W	2500	29/7/87	372
(843., 50.M.)	RCM	3600	56.02N	52.90W	3300	28/7/87	372
(843.,1000.M.)	RCM	3600	56.02N	52.90W	3300	28/7/87	372
(843.,2200.M.)	RCM	3600	56.02N	52.90W	3300	28/7/87	170
(843.,2800.M.)	RCM	3600	56.02N	52.90W	3300	28/7/87	372
(843.,3285.M.)	RCM	3600	56.02N	52.90W	3300	28/7/87	372
(844., 50.M.)	RCM	3600	56.96N	51.59W	3560	28/7/87	372
(844., 960.M.)	RCM	3600	56.96N	51.59W	3560	28/7/87	372
(844.,2160.M.)	RCM	3600	56.96N	51.59W	3560	28/7/87	325
(844.,2760.M.)	RCM	3600	56.96N	51.59W	3560	28/7/87	372
(844.,3545.M.)	RCM	3600	56.96N	51.59W	3560	28/7/87	206

• U,V RECORDED FOR ONLY 330 DAYS

Table 3. Current meter identifications. Each instrument is identified by a station number and a nominal instrument depth.

Figure 10. Time intervals during which each of the current meters returned useful data.



Comments

1)The dashed interval for 841;200 contains 5 gaps of lengths 6 hr, 3 hr, 3 hr, 16 hr and 8 hr.

2)For 841;400 there is a 41 hr gap during days 291 through 293 in 1987.

3)For 843;3285 there is a 6 hr gap during day 9 in 1988 and a 19 hr gap during days 203 to 204 in 1988.

Table 4

Tidal constituents determined from analysis of each of the current meter records. U and V are the eastward and northward velocity components, respectively. For each case, values were obtained from analysis of the full time series as well as from analysis of individual 29 day blocks. Results of the analysis of the full series are quoted with the standard deviation of the 29-day analyses to give some idea of the temporal variability of results. Phases are in GMT.

CONSTITUENT M2

STATION	ELLIPSE: MAJOR AXIS AMPLITUDE (M/S)•100	MAJOR AXIS ORIENTATION (DEG TRUE)	MAJOR AXIS PHASE (DEG)	MINOR AXIS AMPLITUDE (M/S)•100	SENSE OF ROTATION	# BLOCKS
(836., 190.M.)	4.0	331.	205.7	1.3	A	2
(841., 200.M.)	3.8	118.	92.9	0.3	C	2
(841., 400.M.)	4.1	118.	47.9	1.1	C	7
(841., 985.M.)	4.2	124.	46.5	0.5	C	13
(842., 400.M.)	3.6	114.	72.6	0.2	C	11
(842.,1000.M.)	4.4	117.	72.5	0.4	C	13
(842.,2200.M.)	3.8	127.	44.5	0.8	C	13
(843., 50.M.)	2.8	122.	62.8	0.5	A	13
(843.,1000.M.)	2.9	121.	63.1	0.3	A	13
(843.,2200.M.)	3.6	115.	60.6	0.4	C	6
(843.,2800.M.)	4.0	118.	55.8	0.7	C	13
(843.,3285.M.)	4.0	125.	49.6	0.4	C	13
(844., 50.M.)	3.4	130.	70.7	0.0	A	13
(844., 960.M.)	3.1	125.	72.2	0.2	A	13
(844.,2160.M.)	3.3	129.	63.5	0.3	A	11
(844.,2760.M.)	3.3	125.	61.5	0.4	A	13
(844.,3545.M.)	3.5	129.	51.7	0.6	A	7

CONSTITUENT S2

STATION	ELLIPSE: MAJOR AXIS AMPLITUDE (M/S)•100	MAJOR AXIS ORIENTATION (DEG TRUE)	MAJOR AXIS PHASE (DEG)	MINOR AXIS AMPLITUDE (M/S)•100	SENSE OF ROTATION	# BLOCKS
(836., 190.M.)	1.0	329.	242.0	0.2	A	2
(841., 200.M.)	1.2	133.	115.2	0.4	C	2
(841., 400.M.)	1.4	107.	100.3	0.3	C	7
(841., 985.M.)	1.5	120.	63.3	0.4	C	13
(842., 400.M.)	1.9	120.	87.3	0.1	C	11
(842.,1000.M.)	1.5	119.	87.2	0.1	C	13
(842.,2200.M.)	1.1	124.	58.8	0.1	C	13
(843., 50.M.)	1.0	133.	66.2	0.1	A	13
(843.,1000.M.)	1.0	122.	74.8	0.0	A	13
(843.,2200.M.)	0.9	109.	109.8	0.0	C	6
(843.,2800.M.)	1.2	107.	79.5	0.1	C	13
(843.,3285.M.)	1.2	120.	73.2	0.2	C	13
(844., 50.M.)	1.0	133.	82.3	0.1	A	13
(844., 960.M.)	1.0	122.	90.9	0.1	A	13
(844.,2160.M.)	1.0	123.	89.5	0.1	A	11
(844.,2760.M.)	1.2	121.	80.1	0.0	A	13
(844.,3545.M.)	1.3	118.	120.1	0.1	A	7

CONSTITUENT M2

U		V		STATION
AMPLITUDE (M/S)•100	PHASE (DEG)	AMPLITUDE (M/S)•100	PHASE (DEG)	
2.2(+/-0.0)	55.9(+/- 4.2)	3.6(+/-0.4)	195.9(+/- 2.8)	(836., 100.M.)
3.3(+/-0.4)	90.3(+/- 3.6)	1.8(+/-0.4)	282.4(+/- 18.2)	(841., 200.M.)
3.7(+/-0.3)	40.1(+/- 5.3)	2.2(+/-0.7)	253.5(+/- 11.4)	(841., 400.M.)
3.5(+/-0.8)	41.7(+/- 12.8)	2.4(+/-0.8)	236.9(+/- 23.0)	(841., 985.M.)
3.3(+/-0.5)	71.0(+/- 6.3)	1.5(+/-0.3)	260.4(+/- 14.8)	(842., 400.M.)
3.9(+/-0.3)	70.0(+/- 4.4)	2.0(+/-0.3)	262.4(+/- 8.4)	(842.,1000.M.)
3.1(+/-0.4)	35.6(+/- 10.4)	2.4(+/-0.5)	239.7(+/- 15.3)	(842.,2200.M.)
2.4(+/-0.5)	68.8(+/- 17.0)	1.5(+/-0.7)	227.6(+/- 40.8)	(843., 50.M.)
2.5(+/-0.2)	66.3(+/- 4.5)	1.5(+/-0.1)	234.1(+/- 8.2)	(843.,1000.M.)
3.3(+/-0.4)	57.6(+/- 3.4)	1.5(+/-0.2)	254.3(+/- 11.1)	(843.,2200.M.)
3.6(+/-0.4)	50.6(+/- 5.9)	2.0(+/-0.3)	254.0(+/- 12.2)	(843.,2800.M.)
3.3(+/-0.5)	45.9(+/- 8.0)	2.3(+/-0.5)	237.2(+/- 14.3)	(843.,3285.M.)
2.6(+/-0.4)	71.1(+/- 10.1)	2.2(+/-0.4)	250.0(+/- 13.5)	(844., 50.M.)
2.5(+/-0.8)	74.7(+/- 10.8)	1.8(+/-0.6)	246.9(+/- 8.2)	(844., 960.M.)
2.6(+/-0.3)	68.1(+/- 3.6)	2.1(+/-0.2)	236.3(+/- 5.0)	(844.,2160.M.)
2.7(+/-0.3)	66.0(+/- 6.2)	1.9(+/-0.3)	231.8(+/- 11.4)	(844.,2760.M.)
2.7(+/-0.7)	59.2(+/- 12.3)	2.2(+/-0.7)	228.3(+/- 16.6)	(844.,3545.M.)

CONSTITUENT S2

U		V		STATION
AMPLITUDE (M/S)•100	PHASE (DEG)	AMPLITUDE (M/S)•100	PHASE (DEG)	
0.5(+/-0.1)	77.4(+/- 4.0)	0.9(+/-0.3)	236.5(+/- 21.0)	(836., 100.M.)
0.9(+/-0.2)	98.6(+/- 3.9)	0.9(+/-0.2)	314.5(+/- 20.6)	(841., 200.M.)
1.3(+/-0.7)	96.9(+/- 18.7)	0.5(+/-0.4)	313.7(+/- 41.5)	(841., 400.M.)
1.3(+/-0.6)	55.1(+/- 48.0)	0.8(+/-0.6)	266.9(+/- 89.5)	(841., 985.M.)
1.6(+/-0.3)	85.2(+/- 20.9)	0.9(+/-0.4)	273.5(+/- 19.7)	(842., 400.M.)
1.3(+/-0.3)	84.2(+/- 13.2)	0.7(+/-0.3)	277.4(+/- 24.5)	(842.,1000.M.)
0.9(+/-0.3)	56.5(+/- 31.0)	0.6(+/-0.5)	243.9(+/- 32.3)	(842.,2200.M.)
0.7(+/-0.5)	71.6(+/- 42.8)	0.7(+/-0.5)	239.8(+/- 37.4)	(843., 50.M.)
0.8(+/-0.2)	76.5(+/- 13.9)	0.5(+/-0.2)	250.2(+/- 13.7)	(843.,1000.M.)
0.9(+/-0.2)	109.3(+/- 7.7)	0.3(+/-0.2)	294.2(+/- 33.4)	(843.,2200.M.)
1.1(+/-0.3)	78.3(+/- 23.0)	0.3(+/-0.3)	272.5(+/- 69.1)	(843.,2800.M.)
1.1(+/-0.3)	68.6(+/- 14.2)	0.6(+/-0.3)	266.8(+/- 36.8)	(843.,3285.M.)
0.7(+/-0.5)	85.6(+/- 73.1)	0.7(+/-0.6)	258.5(+/- 55.4)	(844., 50.M.)
0.9(+/-0.3)	93.7(+/- 17.2)	0.5(+/-0.3)	263.6(+/- 39.3)	(844., 960.M.)
1.3(+/-0.2)	91.2(+/- 8.3)	0.9(+/-0.2)	265.5(+/- 16.1)	(844.,2160.M.)
1.0(+/-0.2)	81.3(+/- 13.9)	0.6(+/-0.1)	256.8(+/- 15.2)	(844.,2760.M.)
1.2(+/-0.3)	122.2(+/- 33.1)	0.6(+/-0.5)	292.9(+/- 81.1)	(844.,3545.M.)

CONSTITUENT N2

STATION	ELLIPSE: MAJOR AXIS AMPLITUDE (M/S)•100	MAJOR AXIS ORIENTATION (DEG TRUE)	MAJOR AXIS PHASE (DEG)	MINOR AXIS AMPLITUDE (M/S)•100	SENSE OF ROTATION	# BLOCKS
(836.. 190.M.)	1.1	352.	140.3	0.6	A	2
(841.. 200.M.)	1.7	100.	42.6	0.5	C	2
(841.. 400.M.)	1.0	133.	9.4	0.0	C	7
(841.. 985.M.)	1.2	122.	22.4	0.2	C	13
(842.. 400.M.)	1.0	104.	50.2	0.2	C	11
(842..1000.M.)	0.7	111.	38.4	0.0	C	13
(842..2200.M.)	0.7	321.	185.8	0.1	C	13
(843.. 50.M.)	0.9	104.	66.9	0.2	C	13
(843..1000.M.)	0.8	120.	42.9	0.1	C	13
(843..2200.M.)	0.8	120.	26.8	0.1	C	6
(843..2800.M.)	0.7	134.	12.6	0.2	A	13
(843..3285.M.)	0.7	332.	180.0	0.0	A	13
(844.. 50.M.)	0.6	329.	211.1	0.3	A	13
(844.. 960.M.)	0.6	323.	216.2	0.2	A	13
(844..2160.M.)	0.9	125.	39.8	0.1	C	11
(844..2760.M.)	0.9	117.	39.7	0.1	C	13
(844..3545.M.)	0.6	114.	31.4	0.2	A	7

CONSTITUENT K1

STATION	ELLIPSE: MAJOR AXIS AMPLITUDE (M/S)•100	MAJOR AXIS ORIENTATION (DEG TRUE)	MAJOR AXIS PHASE (DEG)	MINOR AXIS AMPLITUDE (M/S)•100	SENSE OF ROTATION	# BLOCKS
(836.. 190.M.)	0.5	326.	249.2	0.0	C	2
(841.. 200.M.)	0.9	97.	21.3	0.1	A	2
(841.. 400.M.)	0.5	99.	342.0	0.2	A	7
(841.. 985.M.)	0.5	102.	298.4	0.1	A	13
(842.. 400.M.)	0.4	66.	317.8	0.1	A	11
(842..1000.M.)	0.5	133.	265.6	0.1	A	13
(842..2200.M.)	0.7	110.	279.5	0.0	C	13
(843.. 50.M.)	0.3	134.	325.3	0.1	C	13
(843..1000.M.)	0.4	116.	302.4	0.0	C	13
(843..2200.M.)	0.5	118.	327.5	0.0	C	6
(843..2800.M.)	0.4	115.	292.7	0.0	A	13
(843..3285.M.)	0.5	118.	296.2	0.0	A	13
(844.. 50.M.)	0.5	320.	134.2	0.0	A	13
(844.. 960.M.)	0.4	134.	305.6	0.1	A	13
(844..2160.M.)	0.3	128.	310.7	0.0	A	11
(844..2760.M.)	0.4	128.	300.7	0.0	A	13
(844..3545.M.)	0.5	129.	333.1	0.0	C	7

CONSTITUENT N2

U		V		
AMPLITUDE (M/S)•100	PHASE (DEG)	AMPLITUDE (M/S)•100	PHASE (DEG)	STATION
0.6(+/-0.1)	37.5(+/- 16.5)	1.1(+/-0.4)	135.9(+/- 23.4)	(836., 190.M.)
1.7(+/-0.1)	39.1(+/- 6.4)	0.6(+/-0.2)	281.5(+/- 52.0)	(841., 200.M.)
0.7(+/-0.5)	7.6(+/- 32.4)	0.7(+/-0.3)	191.4(+/- 35.7)	(841., 400.M.)
1.0(+/-0.7)	17.6(+/- 88.4)	0.7(+/-0.7)	214.4(+/- 78.2)	(841., 985.M.)
1.0(+/-0.4)	47.1(+/- 23.0)	0.3(+/-0.3)	272.5(+/- 63.0)	(842., 400.M.)
0.6(+/-0.3)	38.3(+/- 48.9)	0.2(+/-0.1)	219.0(+/- 69.2)	(842.,1000.M.)
0.5(+/-0.4)	352.4(+/- 82.5)	0.6(+/-0.4)	194.4(+/- 73.9)	(842.,2200.M.)
0.8(+/-0.6)	63.8(+/- 60.3)	0.3(+/-0.4)	286.4(+/-112.1)	(843., 50.M.)
0.7(+/-0.2)	36.9(+/- 12.2)	0.4(+/-0.1)	239.7(+/- 27.2)	(843.,1000.M.)
0.7(+/-0.5)	23.8(+/- 35.5)	0.4(+/-0.3)	215.6(+/- 59.1)	(843.,2200.M.)
0.5(+/-0.4)	26.7(+/- 66.3)	0.5(+/-0.3)	177.8(+/- 57.6)	(843.,2800.M.)
0.3(+/-0.4)	5.8(+/- 85.1)	0.6(+/-0.4)	178.4(+/- 56.8)	(843.,3285.M.)
0.4(+/-0.5)	69.7(+/- 64.6)	0.6(+/-0.5)	194.9(+/- 71.5)	(844., 50.M.)
0.4(+/-0.2)	56.6(+/- 57.7)	0.5(+/-0.3)	204.7(+/- 40.4)	(844., 960.M.)
0.7(+/-0.2)	33.3(+/- 16.8)	0.5(+/-0.3)	233.3(+/- 25.8)	(844.,2160.M.)
0.8(+/-0.3)	36.6(+/- 20.7)	0.4(+/-0.3)	231.2(+/- 53.9)	(844.,2760.M.)
0.6(+/-0.4)	39.6(+/- 66.6)	0.3(+/-0.4)	175.4(+/- 94.4)	(844.,3545.M.)

CONSTITUENT K1

U		V		
AMPLITUDE (M/S)•100	PHASE (DEG)	AMPLITUDE (M/S)•100	PHASE (DEG)	STATION
0.3(+/-0.1)	66.3(+/- 36.9)	0.4(+/-0.1)	250.4(+/- 33.6)	(836., 190.M.)
0.9(+/-0.3)	21.9(+/- 3.7)	0.1(+/-0.1)	167.3(+/- 27.7)	(841., 200.M.)
0.5(+/-0.2)	346.0(+/- 49.2)	0.2(+/-0.3)	90.8(+/- 82.5)	(841., 400.M.)
0.5(+/-0.5)	300.4(+/- 82.4)	0.1(+/-0.4)	79.1(+/- 91.6)	(841., 985.M.)
0.3(+/-0.3)	309.4(+/- 46.7)	0.2(+/-0.3)	354.8(+/-100.5)	(842., 400.M.)
0.4(+/-0.2)	278.1(+/- 52.1)	0.4(+/-0.2)	71.4(+/- 64.9)	(842.,1000.M.)
0.6(+/-0.2)	278.1(+/- 39.6)	0.2(+/-0.3)	110.3(+/- 92.5)	(842.,2200.M.)
0.2(+/-0.3)	306.2(+/- 70.5)	0.2(+/-0.5)	165.8(+/- 65.9)	(843., 50.M.)
0.3(+/-0.1)	301.1(+/- 10.6)	0.2(+/-0.1)	127.8(+/- 51.4)	(843.,1000.M.)
0.4(+/-0.1)	326.8(+/- 14.4)	0.2(+/-0.0)	150.3(+/- 14.9)	(843.,2200.M.)
0.4(+/-0.1)	293.5(+/- 16.2)	0.2(+/-0.1)	109.1(+/- 28.0)	(843.,2800.M.)
0.4(+/-0.2)	297.6(+/- 13.8)	0.2(+/-0.1)	111.0(+/- 43.0)	(843.,3285.M.)
0.3(+/-0.4)	319.5(+/- 43.1)	0.4(+/-0.3)	130.6(+/- 44.9)	(844., 50.M.)
0.3(+/-0.4)	312.5(+/- 44.6)	0.3(+/-0.2)	117.9(+/- 43.7)	(844., 960.M.)
0.3(+/-0.1)	311.9(+/- 29.6)	0.2(+/-0.1)	128.7(+/- 57.3)	(844.,2160.M.)
0.3(+/-0.1)	301.5(+/- 22.0)	0.2(+/-0.1)	119.4(+/- 29.9)	(844.,2760.M.)
0.4(+/-0.1)	332.5(+/- 15.5)	0.3(+/-0.1)	154.0(+/- 8.8)	(844.,3545.M.)

CONSTITUENT O1

STATION	ELLIPSE: MAJOR AXIS AMPLITUDE (M/S)•100	MAJOR AXIS ORIENTATION (DEG TRUE)	MAJOR AXIS PHASE (DEG)	MINOR AXIS AMPLITUDE (M/S)•100	SENSE OF ROTATION	# BLOCKS
(836.. 190.M.)	0.5	122.	352.1	0.1	C	2
(841.. 200.M.)	0.3	32.	262.0	0.3	C	2
(841.. 400.M.)	0.2	335.	305.6	0.2	A	7
(841.. 985.M.)	0.2	108.	232.0	0.1	C	13
(842.. 400.M.)	0.2	128.	275.6	0.2	C	11
(842..1000.M.)	0.4	93.	207.6	0.1	C	13
(842..2200.M.)	0.3	114.	196.8	0.1	C	13
(843.. 50.M.)	0.3	320.	3.2	0.1	A	13
(843..1000.M.)	0.2	96.	248.2	0.1	A	13
(843..2200.M.)	0.1	84.	258.0	0.0	A	6
(843..2800.M.)	0.1	109.	228.7	0.1	A	13
(843..3285.M.)	0.2	98.	234.5	0.0	A	13
(844.. 50.M.)	0.3	112.	230.2	0.0	C	13
(844.. 960.M.)	0.2	134.	228.4	0.0	A	13
(844..2160.M.)	0.2	123.	253.9	0.0	A	11
(844..2760.M.)	0.2	123.	253.9	0.0	A	13
(844..3545.M.)	0.2	316.	84.2	0.0	C	7

CONSTITUENT M4

STATION	ELLIPSE: MAJOR AXIS AMPLITUDE (M/S)•100	MAJOR AXIS ORIENTATION (DEG TRUE)	MAJOR AXIS PHASE (DEG)	MINOR AXIS AMPLITUDE (M/S)•100	SENSE OF ROTATION	# BLOCKS
(836.. 190.M.)	0.2	330.	211.6	0.0	C	2
(841.. 200.M.)	0.2	327.	42.3	0.0	A	2
(841.. 400.M.)	0.2	13.	33.0	0.0	C	7
(841.. 985.M.)	0.2	14.	9.3	0.2	C	13
(842.. 400.M.)	0.1	123.	200.8	0.1	C	11
(842..1000.M.)	0.2	125.	252.3	0.0	C	13
(842..2200.M.)	0.1	325.	228.9	0.0	C	13
(843.. 50.M.)	0.1	102.	158.4	0.0	A	13
(843..1000.M.)	0.0	336.	326.1	0.0	C	13
(843..2200.M.)	0.0	347.	48.5	0.0	C	6
(843..2800.M.)	0.0	18.	283.8	0.0	C	13
(843..3285.M.)	0.1	322.	264.9	0.0	A	13
(844.. 50.M.)	0.1	339.	58.4	0.0	C	13
(844.. 960.M.)	0.1	317.	66.4	0.0	C	13
(844..2160.M.)	0.0	131.	238.4	0.0	A	11
(844..2760.M.)	0.0	344.	68.8	0.0	C	13
(844..3545.M.)	0.1	325.	244.3	0.0	A	7

CONSTITUENT O1

U		V		
AMPLITUDE (M/S)•100	PHASE (DEG)	AMPLITUDE (M/S)•100	PHASE (DEG)	STATION
0.4(+/-0.1)	342.5(+/- 1.3)	0.3(+/-0.1)	196.2(+/- 2.5)	(836., 190.M.)
0.3(+/-0.2)	315.0(+/- 11.2)	0.3(+/-0.4)	234.3(+/-125.4)	(841., 200.M.)
0.2(+/-0.3)	184.6(+/- 89.5)	0.2(+/-0.3)	286.2(+/-145.6)	(841., 400.M.)
0.2(+/-0.3)	223.8(+/-119.9)	0.1(+/-0.4)	105.4(+/-106.0)	(841., 985.M.)
0.2(+/-0.2)	241.3(+/-131.4)	0.2(+/-0.3)	144.4(+/-130.0)	(842., 400.M.)
0.4(+/-0.4)	207.0(+/- 71.0)	0.1(+/-0.3)	101.2(+/- 89.9)	(842.,1000.M.)
0.3(+/-0.3)	188.2(+/- 68.6)	0.1(+/-0.3)	53.1(+/- 88.2)	(842.,2200.M.)
0.2(+/-0.3)	196.6(+/- 79.0)	0.2(+/-0.3)	353.9(+/-114.6)	(843., 50.M.)
0.2(+/-0.1)	250.2(+/- 40.5)	0.1(+/-0.1)	355.7(+/-108.4)	(843.,1000.M.)
0.1(+/-0.1)	256.1(+/- 20.2)	0.1(+/-0.0)	330.8(+/- 74.1)	(843.,2200.M.)
0.1(+/-0.1)	236.8(+/- 38.8)	0.1(+/-0.1)	360.0(+/- 63.9)	(843.,2800.M.)
0.2(+/-0.1)	234.5(+/- 32.1)	0.0(+/-0.1)	53.0(+/-107.9)	(843.,3285.M.)
0.3(+/-0.4)	229.7(+/- 89.5)	0.1(+/-0.5)	53.6(+/- 88.5)	(844., 50.M.)
0.1(+/-0.2)	236.3(+/- 69.3)	0.1(+/-0.2)	40.1(+/-115.5)	(844., 960.M.)
0.2(+/-0.1)	255.5(+/- 39.6)	0.1(+/-0.1)	70.2(+/- 53.9)	(844.,2160.M.)
0.2(+/-0.1)	260.5(+/- 39.3)	0.1(+/-0.1)	58.3(+/- 66.3)	(844.,2760.M.)
0.1(+/-0.1)	256.1(+/- 67.2)	0.1(+/-0.1)	92.0(+/- 47.7)	(844.,3545.M.)

CONSTITUENT M4

U		V		
AMPLITUDE (M/S)•100	PHASE (DEG)	AMPLITUDE (M/S)•100	PHASE (DEG)	STATION
0.1(+/-0.0)	18.5(+/- 57.6)	0.2(+/-0.0)	216.3(+/- 59.2)	(836., 190.M.)
0.1(+/-0.0)	231.5(+/- 38.5)	0.2(+/-0.1)	38.5(+/- 6.3)	(841., 200.M.)
0.0(+/-0.1)	68.2(+/-104.6)	0.2(+/-0.2)	30.9(+/- 71.7)	(841., 400.M.)
0.2(+/-0.3)	83.6(+/- 63.0)	0.2(+/-0.2)	357.5(+/- 82.3)	(841., 985.M.)
0.1(+/-0.1)	180.6(+/- 82.0)	0.1(+/-0.2)	62.4(+/- 97.8)	(842., 400.M.)
0.2(+/-0.1)	245.6(+/- 54.5)	0.1(+/-0.1)	86.0(+/- 74.6)	(842.,1000.M.)
0.1(+/-0.1)	18.5(+/- 96.0)	0.1(+/-0.3)	244.9(+/-120.1)	(842.,2200.M.)
0.1(+/-0.1)	160.8(+/-102.2)	0.0(+/-0.1)	295.4(+/-111.5)	(843., 50.M.)
0.0(+/-0.1)	102.5(+/-105.5)	0.0(+/-0.0)	336.6(+/-108.6)	(843.,1000.M.)
0.0(+/-0.1)	156.1(+/- 84.7)	0.0(+/-0.1)	58.5(+/- 57.5)	(843.,2200.M.)
0.0(+/-0.1)	348.5(+/-108.3)	0.0(+/-0.1)	271.4(+/- 93.1)	(843.,2800.M.)
0.1(+/-0.1)	88.3(+/- 66.9)	0.1(+/-0.1)	262.8(+/- 80.5)	(843.,3285.M.)
0.0(+/-0.1)	236.9(+/- 99.3)	0.1(+/-0.1)	58.6(+/-108.0)	(844., 50.M.)
0.1(+/-0.1)	226.1(+/- 78.1)	0.1(+/-0.1)	84.2(+/- 70.0)	(844., 960.M.)
0.0(+/-0.0)	262.7(+/- 80.9)	0.0(+/-0.0)	26.7(+/-110.8)	(844.,2160.M.)
0.0(+/-0.1)	178.1(+/-109.0)	0.0(+/-0.1)	82.3(+/- 99.2)	(844.,2760.M.)
0.1(+/-0.1)	77.1(+/- 93.8)	0.1(+/-0.0)	237.8(+/- 64.9)	(844.,3545.M.)

CONSTITUENT MS4

STATION	ELLIPSE: MAJOR AXIS AMPLITUDE (M/S)•100	MAJOR AXIS ORIENTATION (DEG TRUE)	MAJOR AXIS PHASE (DEG)	MINOR AXIS AMPLITUDE (M/S)•100	SENSE OF ROTATION	# BLOCKS
(836.. 100.M.)	0.3	15.	235.5	0.1	C	2
(841.. 200.M.)	0.3	319.	339.4	0.0	A	2
(841.. 400.M.)	0.1	75.	139.5	0.1	C	7
(841.. 985.M.)	0.2	34.	32.4	0.1	C	13
(842.. 400.M.)	0.1	120.	270.9	0.0	C	11
(842..1000.M.)	0.1	113.	339.1	0.0	A	13
(842..2200.M.)	0.1	336.	45.5	0.0	A	13
(843.. 50.M.)	0.1	39.	192.3	0.0	A	13
(843..1000.M.)	0.0	18.	151.1	0.0	A	13
(843..2200.M.)	0.0	34.	337.3	0.0	C	6
(843..2800.M.)	0.0	128.	335.1	0.0	C	13
(843..3285.M.)	0.1	317.	302.2	0.0	C	13
(844.. 50.M.)	0.1	110.	148.2	0.0	C	13
(844.. 960.M.)	0.1	120.	276.4	0.0	C	13
(844..2160.M.)	0.1	333.	103.3	0.0	C	11
(844..2760.M.)	0.0	335.	103.2	0.0	A	13
(844..3545.M.)	0.1	89.	105.1	0.0	C	7

CONSTITUENT MF

STATION	ELLIPSE: MAJOR AXIS AMPLITUDE (M/S)•100	MAJOR AXIS ORIENTATION (DEG TRUE)	MAJOR AXIS PHASE (DEG)	MINOR AXIS AMPLITUDE (M/S)•100	SENSE OF ROTATION	# BLOCKS
(836.. 100.M.)	0.5	320.	56.0	0.1	A	2
(841.. 200.M.)	2.2	82.	26.5	0.2	C	2
(841.. 400.M.)	0.7	108.	264.9	0.2	A	7
(841.. 985.M.)	0.7	134.	21.0	0.1	C	13
(842.. 400.M.)	0.7	2.	56.4	0.0	A	11
(842..1000.M.)	0.8	342.	39.3	0.4	C	13
(842..2200.M.)	0.9	118.	149.7	0.3	C	13
(843.. 50.M.)	0.9	0.	57.8	0.0	A	13
(843..1000.M.)	0.7	2.	30.1	0.0	A	13
(843..2200.M.)	0.8	9.	79.3	0.2	C	6
(843..2800.M.)	0.5	9.	357.9	0.1	A	13
(843..3285.M.)	0.7	23.	342.8	0.3	A	13
(844.. 50.M.)	1.2	12.	262.7	0.4	C	13
(844.. 960.M.)	1.1	358.	242.2	0.5	C	13
(844..2160.M.)	1.1	348.	210.2	0.7	C	11
(844..2760.M.)	0.7	344.	217.7	0.4	C	13
(844..3545.M.)	0.5	27.	177.7	0.2	A	7

CONSTITUENT MS4

U		V		
AMPLITUDE (M/S)*100	PHASE (DEG)	AMPLITUDE (M/S)*100	PHASE (DEG)	STATION
0.1(+/-0.0)	288.0(+/- 75.0)	0.3(+/-0.1)	230.5(+/- 14.7)	(836., 190.M.)
0.2(+/-0.1)	165.3(+/- 57.6)	0.2(+/-0.0)	334.9(+/- 37.0)	(841., 200.M.)
0.1(+/-0.1)	146.0(+/- 69.3)	0.1(+/-0.1)	82.3(+/-103.9)	(841., 400.M.)
0.1(+/-0.2)	51.9(+/- 94.0)	0.2(+/-0.2)	23.4(+/- 87.3)	(841., 985.M.)
0.1(+/-0.1)	261.4(+/- 95.2)	0.0(+/-0.2)	117.7(+/-105.8)	(842., 400.M.)
0.1(+/-0.1)	349.5(+/-113.0)	0.1(+/-0.1)	113.8(+/- 75.7)	(842.,1000.M.)
0.0(+/-0.1)	259.6(+/- 89.5)	0.0(+/-0.2)	37.5(+/-100.7)	(842.,2200.M.)
0.1(+/-0.1)	189.1(+/-106.1)	0.1(+/-0.2)	194.5(+/-104.7)	(843., 50.M.)
0.0(+/-0.1)	96.0(+/-104.2)	0.0(+/-0.1)	160.0(+/- 99.9)	(843.,1000.M.)
0.0(+/-0.0)	0.6(+/- 86.0)	0.0(+/-0.1)	325.9(+/-105.1)	(843.,2200.M.)
0.0(+/-0.1)	305.9(+/- 83.6)	0.0(+/-0.0)	196.8(+/-103.6)	(843.,2800.M.)
0.1(+/-0.1)	108.1(+/-119.4)	0.1(+/-0.1)	314.2(+/- 82.5)	(843.,3285.M.)
0.1(+/-0.1)	138.5(+/-118.6)	0.0(+/-0.2)	19.5(+/-106.1)	(844., 50.M.)
0.1(+/-0.1)	266.3(+/- 80.6)	0.0(+/-0.1)	123.9(+/- 80.9)	(844., 960.M.)
0.0(+/-0.1)	249.8(+/- 78.3)	0.1(+/-0.1)	112.9(+/- 56.8)	(844.,2160.M.)
0.0(+/-0.1)	289.0(+/-113.3)	0.0(+/-0.1)	102.0(+/-106.9)	(844.,2760.M.)
0.1(+/-0.1)	105.2(+/- 61.0)	0.0(+/-0.1)	38.9(+/- 99.3)	(844.,3545.M.)

CONSTITUENT MF

U		V		
AMPLITUDE (M/S)*100	PHASE (DEG)	AMPLITUDE (M/S)*100	PHASE (DEG)	STATION
0.3(+/-0.2)	253.6(+/- 52.4)	0.4(+/-0.8)	43.8(+/- 37.7)	(836., 190.M.)
2.1(+/-1.3)	27.2(+/- 44.9)	0.4(+/-0.3)	355.8(+/-115.0)	(841., 200.M.)
0.6(+/-1.1)	270.9(+/-105.1)	0.3(+/-0.4)	38.7(+/- 98.8)	(841., 400.M.)
0.5(+/-1.1)	15.5(+/- 88.7)	0.5(+/-0.6)	206.9(+/- 88.6)	(841., 985.M.)
0.0(+/-1.3)	0.3(+/-109.2)	0.7(+/-1.1)	56.5(+/- 96.1)	(842., 400.M.)
0.5(+/-1.7)	159.3(+/-120.3)	0.7(+/-1.4)	49.6(+/-101.2)	(842.,1000.M.)
0.8(+/-1.3)	139.5(+/-107.4)	0.5(+/-0.9)	1.2(+/- 98.6)	(842.,2200.M.)
0.0(+/-1.0)	291.0(+/-102.1)	0.9(+/-1.3)	57.8(+/-124.8)	(843., 50.M.)
0.0(+/-0.9)	334.7(+/-110.0)	0.7(+/-1.0)	30.2(+/-110.0)	(843.,1000.M.)
0.2(+/-0.1)	134.2(+/- 79.5)	0.8(+/-0.5)	77.2(+/- 49.6)	(843.,2200.M.)
0.1(+/-0.6)	318.8(+/-103.7)	0.5(+/-1.1)	359.1(+/-112.2)	(843.,2800.M.)
0.4(+/-0.9)	297.3(+/-114.5)	0.6(+/-1.2)	353.4(+/-114.2)	(843.,3285.M.)
0.4(+/-0.9)	320.5(+/- 95.5)	1.1(+/-1.3)	258.9(+/- 72.4)	(844., 50.M.)
0.5(+/-1.3)	336.0(+/-100.4)	1.1(+/-1.9)	242.9(+/- 93.2)	(844., 960.M.)
0.8(+/-0.8)	317.5(+/-103.4)	1.1(+/-1.3)	218.3(+/- 79.6)	(844.,2160.M.)
0.4(+/-0.7)	337.2(+/- 97.9)	0.7(+/-0.9)	226.5(+/- 88.0)	(844.,2760.M.)
0.3(+/-0.5)	138.4(+/- 92.7)	0.5(+/-0.3)	189.5(+/- 81.1)	(844.,3545.M.)

Figure 11. Residual data for each of the current meters moored between Hamilton Bank and OWS Bravo during the 1987/88 field year. Information includes a location plot, basic statistics, rotary spectrum, various time series plots of the current data, temperature, salinity and σ_θ time series, and progressive vector diagrams.

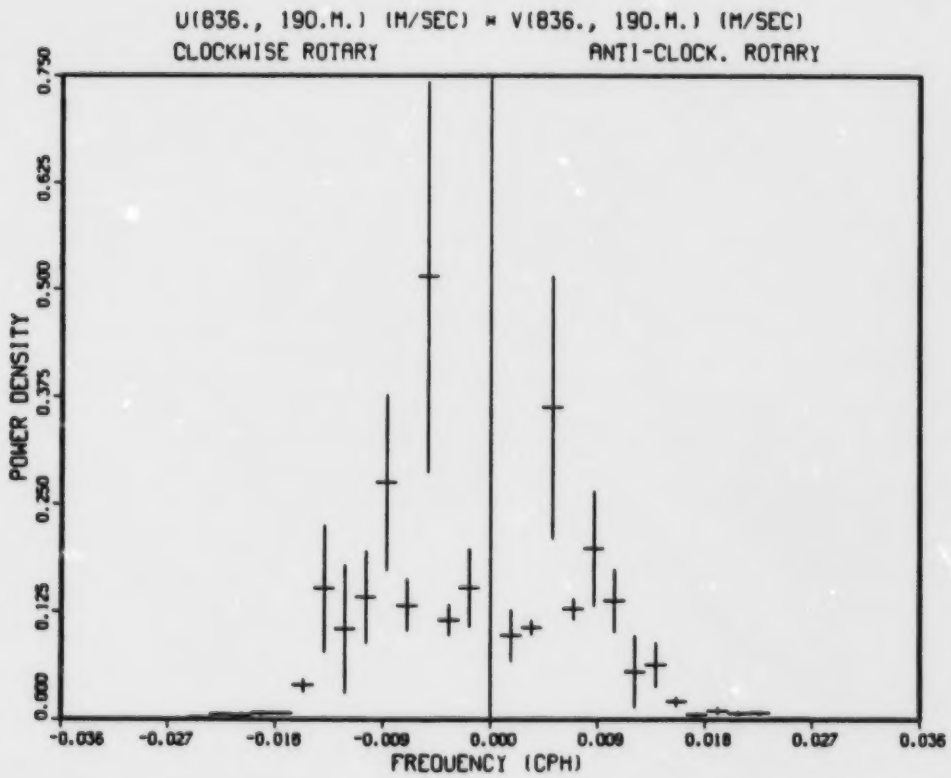
CM(836; 190.M.) - RESIDUAL STATISTICS

POSITION	53.742 N 55.462 W
BOTTOM DEPTH	194.0 M
DURATION	60.3 DAYS

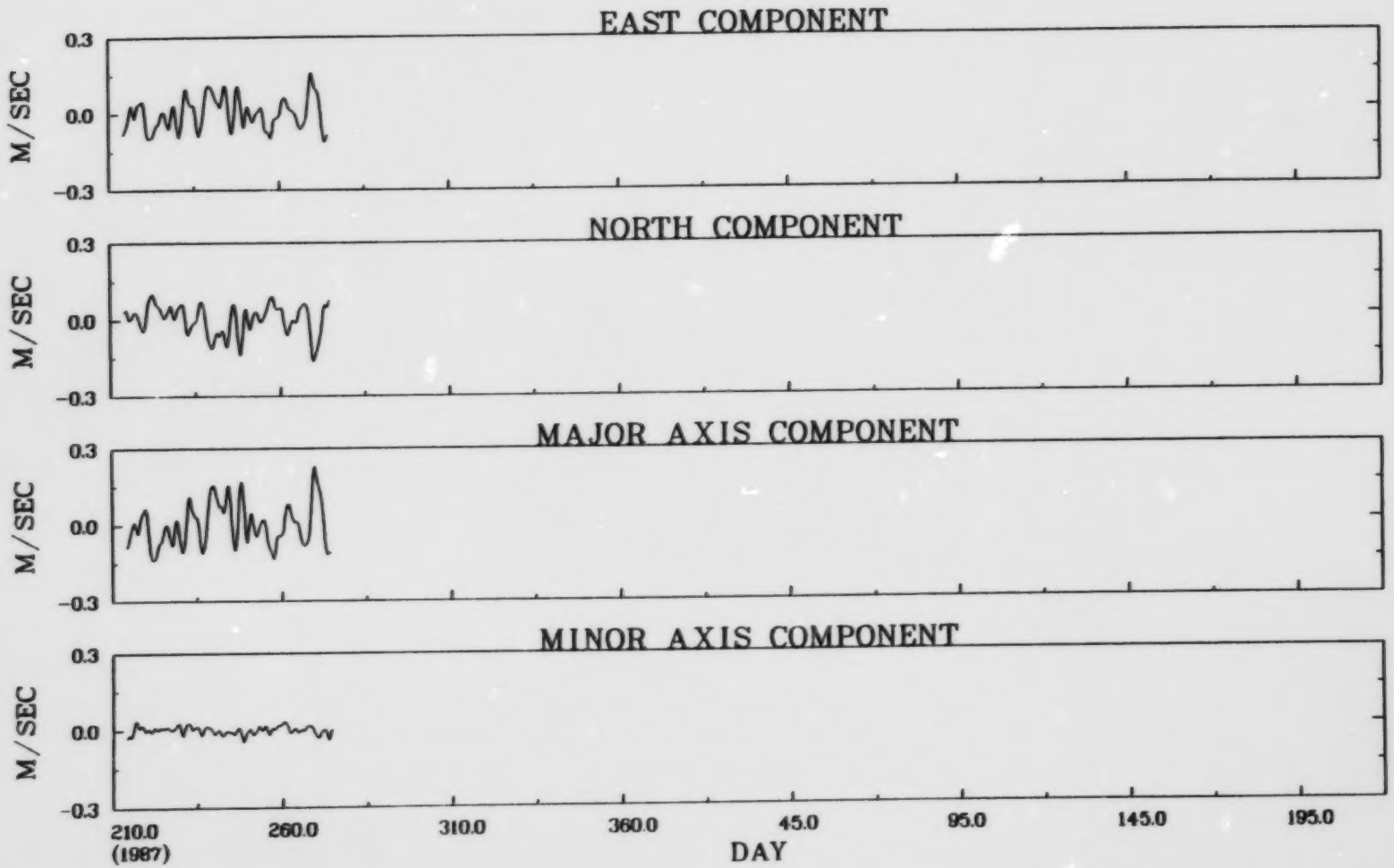
		MINIMUM	MAXIMUM	MEAN	STD. DEV.
TEMPERATURE	DEG C	-1.33	-.60	-1.05	.13
N-S COMPONENT	M/S	-.21	.06	-.04	.06
E-W COMPONENT	M/S	-.07	.20	.04	.06
MAJOR AXIS	M/S	-.08	.29	.06	.08
MINOR AXIS	M/S	-.05	.03	-.01	.01

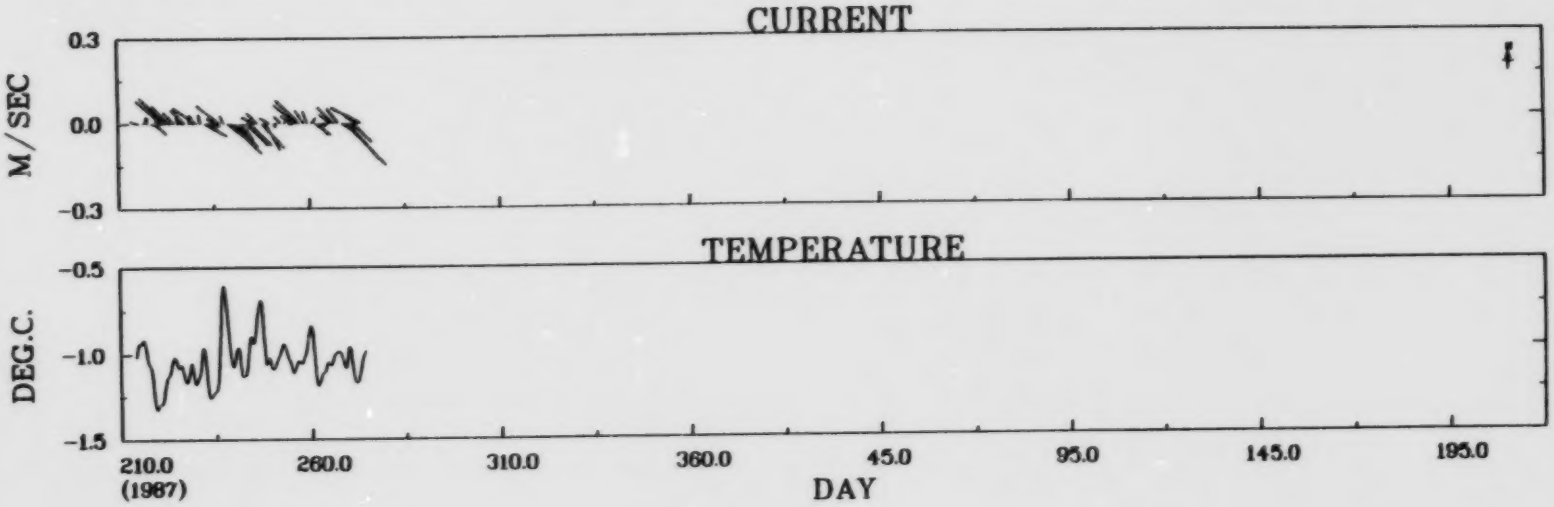
MAJOR AXIS ORIENTATION 42.0 DEGREES TRUE

ROTARY SPECTRUM OF TOTAL SIGNAL

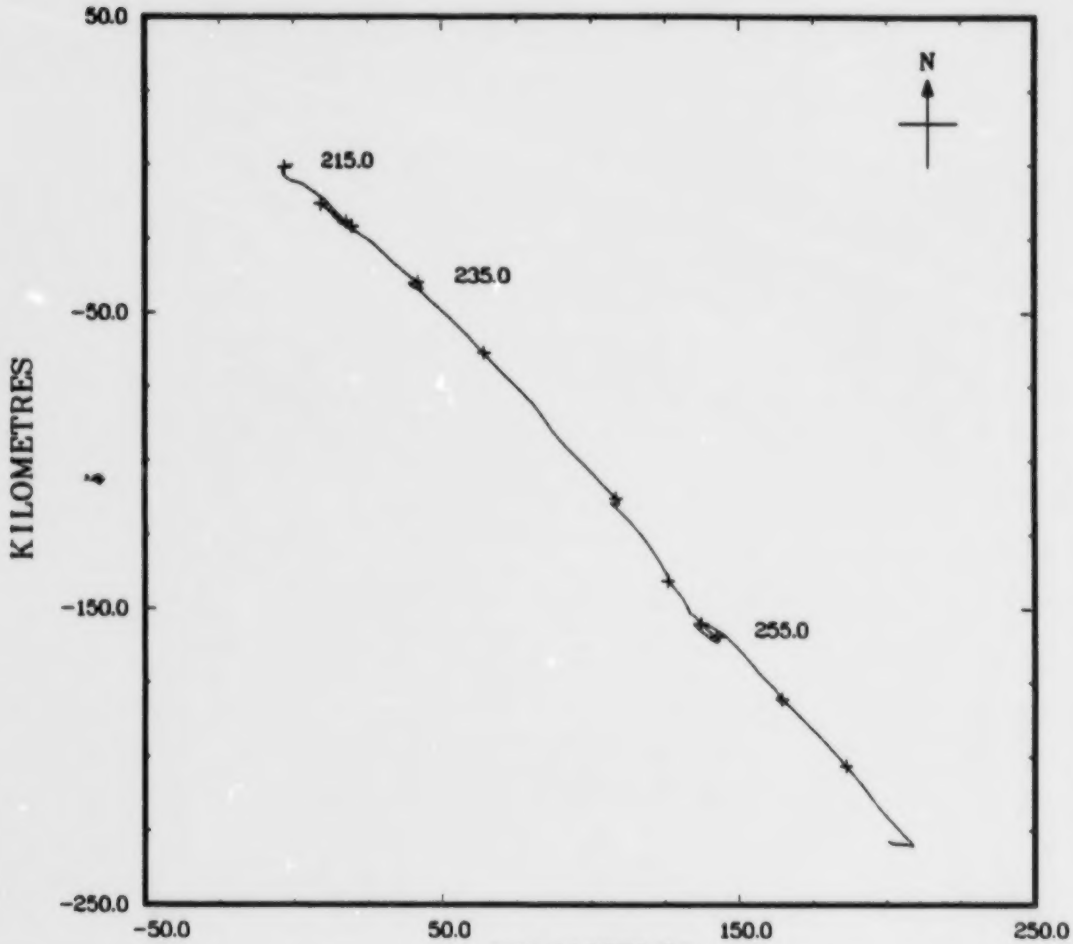


CM(836; 190M) - RESIDUALS
POSITION 53.742 N 55.462 W




CURRENT
0.3
0.0
-0.3
M/SEC
TEMPERATURE
-0.5
-1.0
-1.5
DEG.C.
210.0
(1987)
260.0
310.0
360.0
45.0
95.0
145.0
195.0
DAY

STN. 836, 190 M.



AUGUST 2 1987 TO OCTOBER 1 1987

CM(841; 200.M.) - RESIDUAL STATISTICS

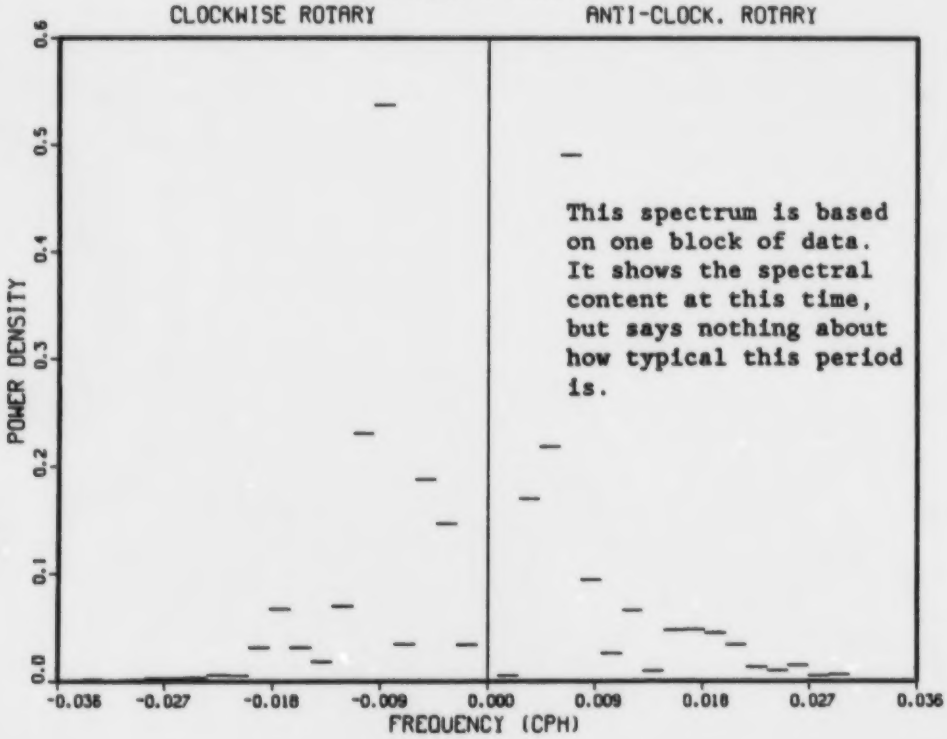
POSITION 55.084 N 54.010 W
BOTTOM DEPTH 1000.0 M
DURATION 40.3 DAYS

		MINIMUM	MAXIMUM	MEAN	STD. DEV.
TEMPERATURE	DEG C	3.22	4.31	3.76	.22
SALINITY		34.86	35.08	34.97	.05
SIGMA-THETA	KG/M**3	27.75	27.84	27.79	.02
N-S COMPONENT	M/S	-.25	.00	-.11	.04
E-W COMPONENT	M/S	.05	.32	.20	.05
MAJOR AXIS	M/S	.07	.33	.20	.05
MINOR AXIS	M/S	.00	.19	.11	.04

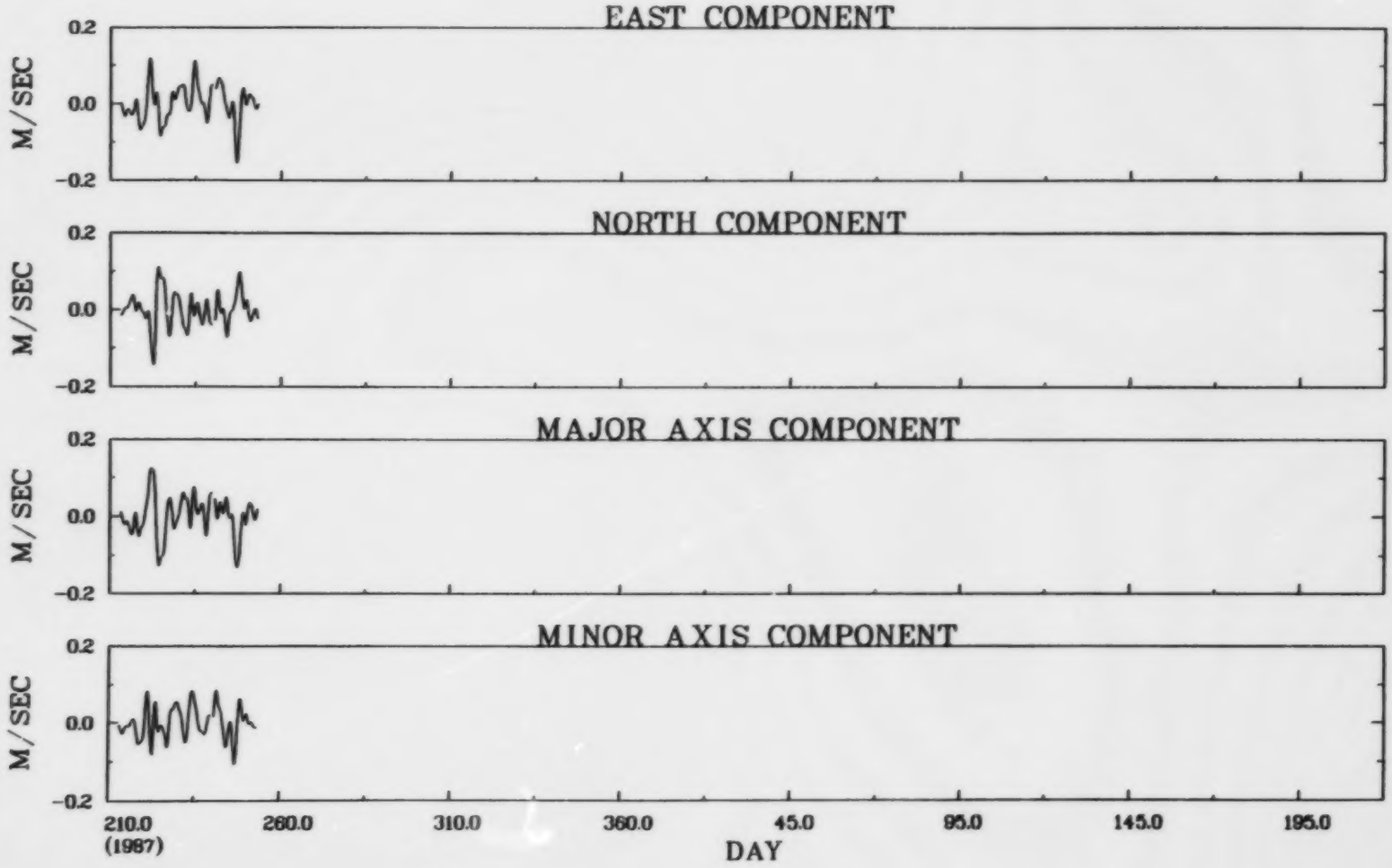
MAJOR AXIS ORIENTATION 22.3 DEGREES TRUE

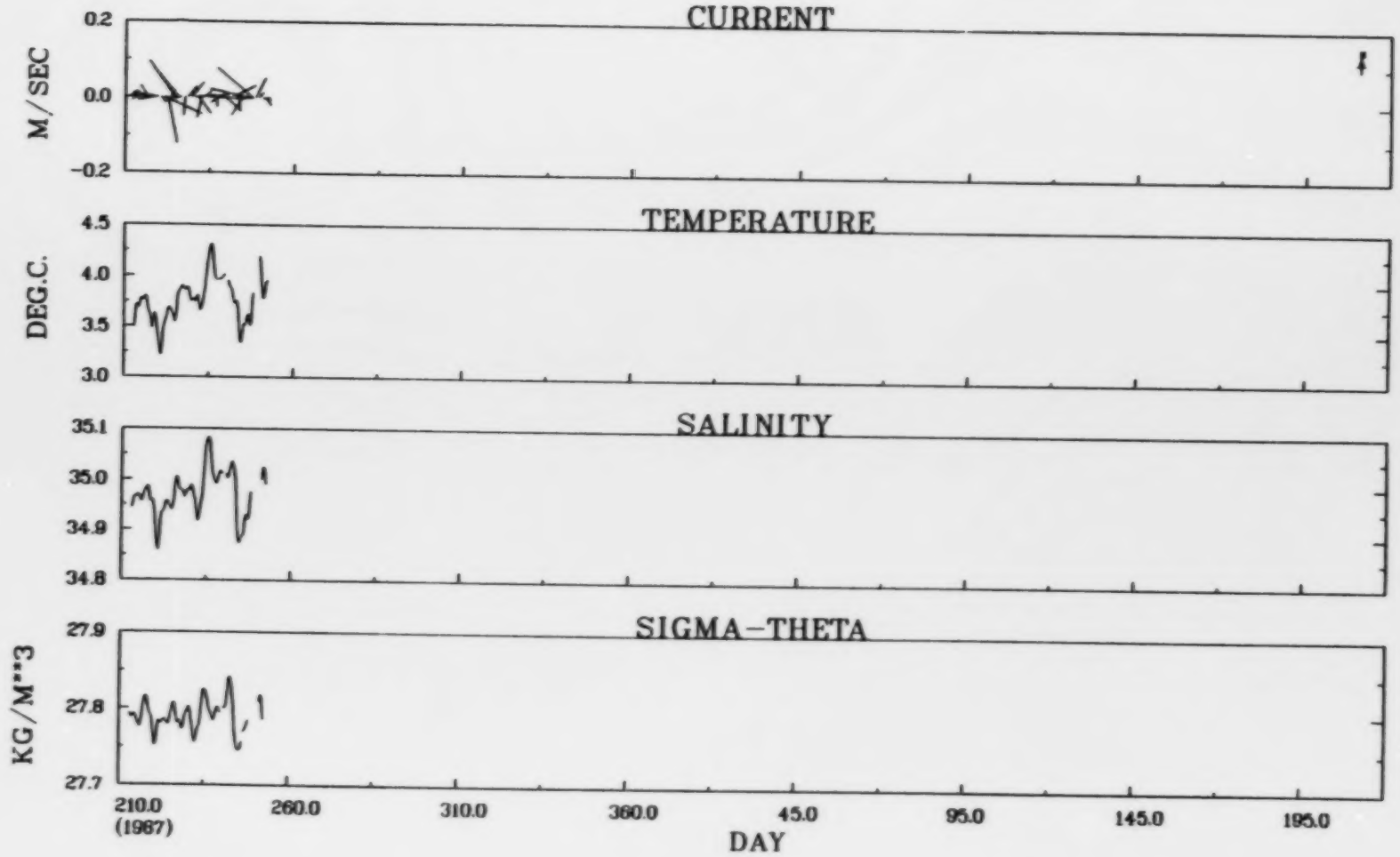
ROTARY SPECTRUM OF TOTAL SIGNAL

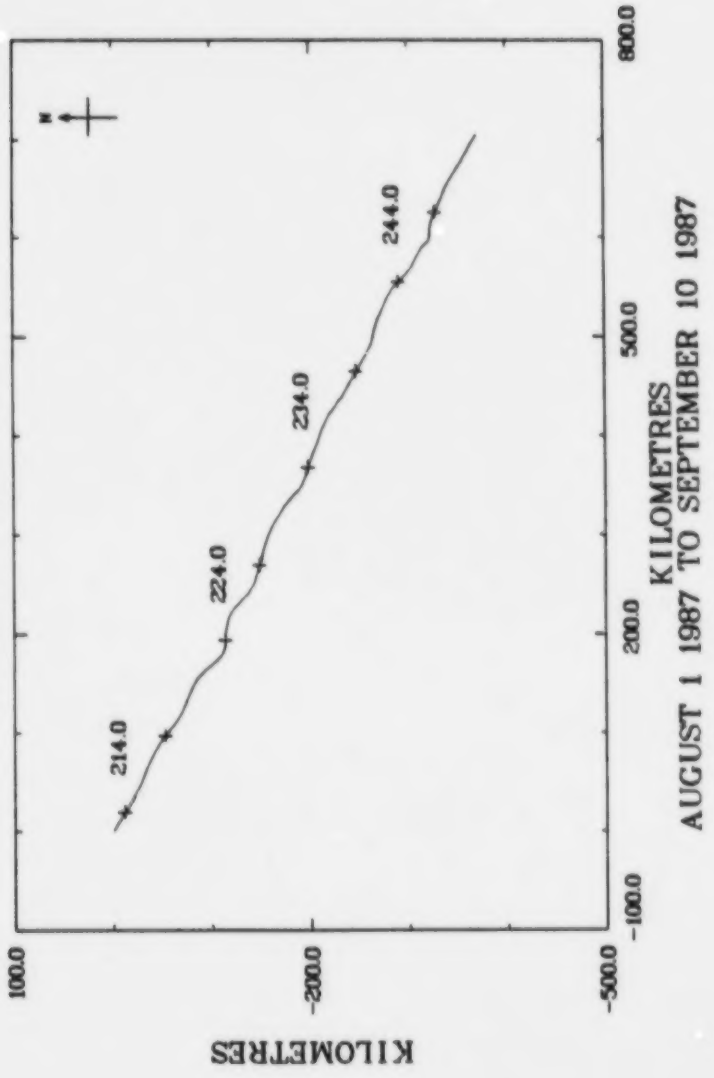
U(841., 200.M.) (M/SEC) x V(841., 200.M.) (M/SEC)



CM(841; 200M) - RESIDUALS
POSITION 55.084 N 54.010 W




CURRENT
M/SEC
0.2
0.0
-0.2
TEMPERATURE
DEG.C.
4.5
4.0
3.5
3.0
SALINITY
35.1
35.0
34.9
34.8
SIGMA-THETA
KG/M**3
27.9
27.8
27.7
210.0
(1987)
260.0
310.0
360.0
45.0
95.0
145.0
195.0
DAY


STN. 841, 200 M.
214.0
224.0
234.0
244.0
100.0
-200.0
-500.0
-100.0
200.0
500.0
800.0
KILOMETRES
KILOMETRES
AUGUST 1 1987 TO SEPTEMBER 10 1987

CM(841; 400.M.) - RESIDUAL STATISTICS

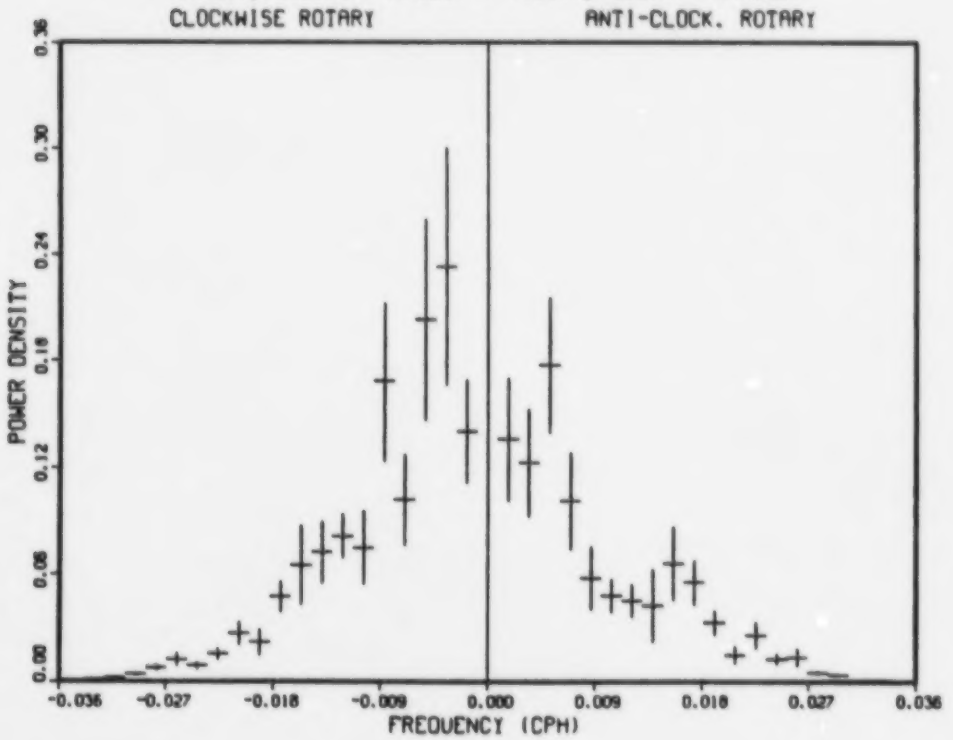
POSITION	55.084 N 54.010 W
BOTTOM DEPTH	1000.0 M
DURATION	189.8 DAYS

		MINIMUM	MAXIMUM	MEAN	STD. DEV.
TEMPERATURE	DEG C	2.82	4.25	4.00	.24
SALINITY		34.75	35.07	35.01	.05
SIGMA-THETA	KG/M**3	27.70	27.85	27.80	.02
N-S COMPONENT	M/S	-.21	.07	-.08	.04
E-W COMPONENT	M/S	.02	.37	.19	.06
MAJOR AXIS	M/S	.03	.41	.20	.07
MINOR AXIS	M/S	-.10	.13	.00	.03

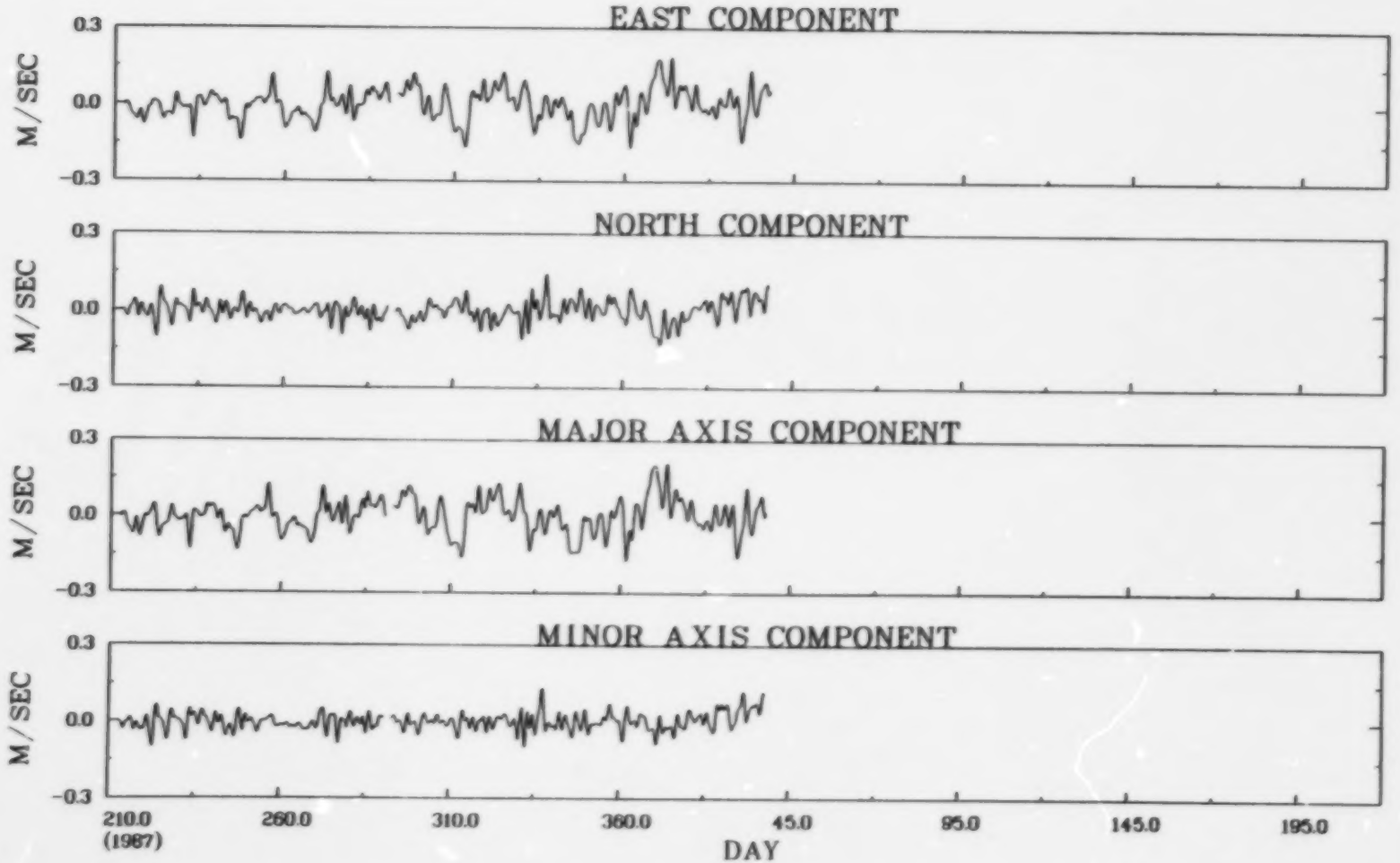
MAJOR AXIS ORIENTATION 22.3 DEGREES TRUE

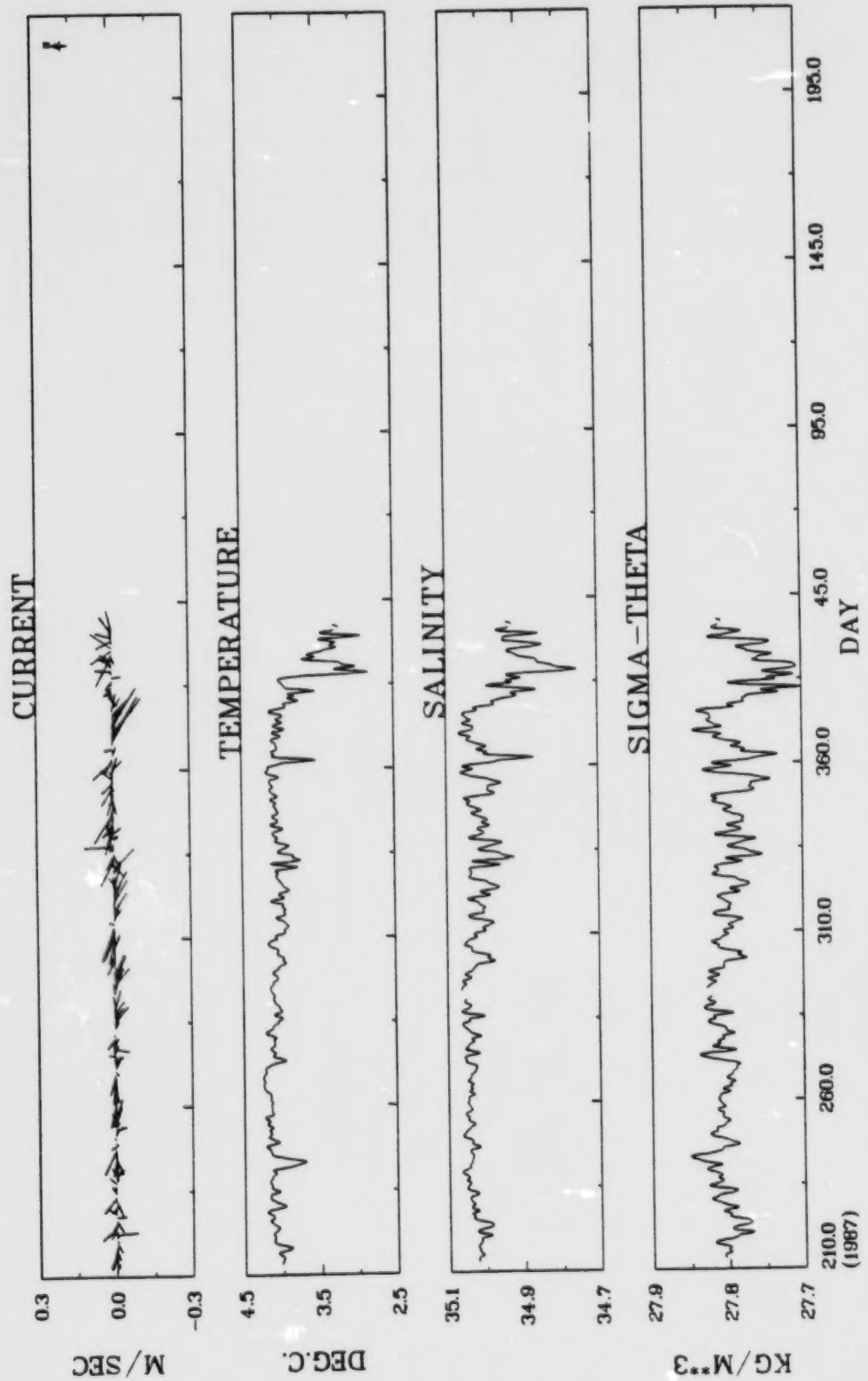
ROTARY SPECTRUM OF TOTAL SIGNAL

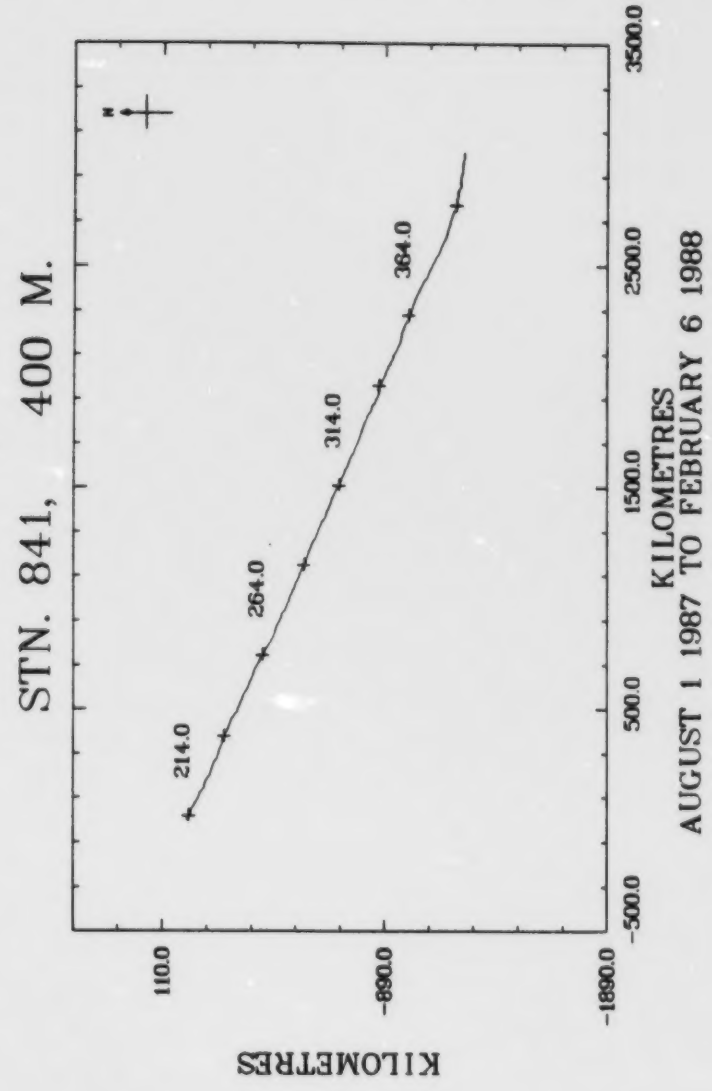
U(841., 400.M.) (M/SEC) + V(841., 400.M.) (M/SEC)



CM(841; 400M) - RESIDUALS
POSITION 55.084 N 54.010 W




CURRENT
TEMPERATURE
SALINITY
SIGMA-THETA
M/SEC
DEG.C.
KG/M**3
0.3
0.0
-0.3
4.5
3.5
2.5
35.1
34.9
34.7
27.9
27.8
27.7
210.0
(1987)
260.0
310.0
360.0
45.0
95.0
145.0
195.0
DAY


STN. 841, 400 M.
214.0
264.0
314.0
364.0
110.0
-890.0
-1890.0
-500.0
500.0
1500.0
2500.0
3500.0
KILOMETRES
KILOMETRES
AUGUST 1 1987 TO FEBRUARY 6 1988

CM(841; 985.M.) - RESIDUAL STATISTICS

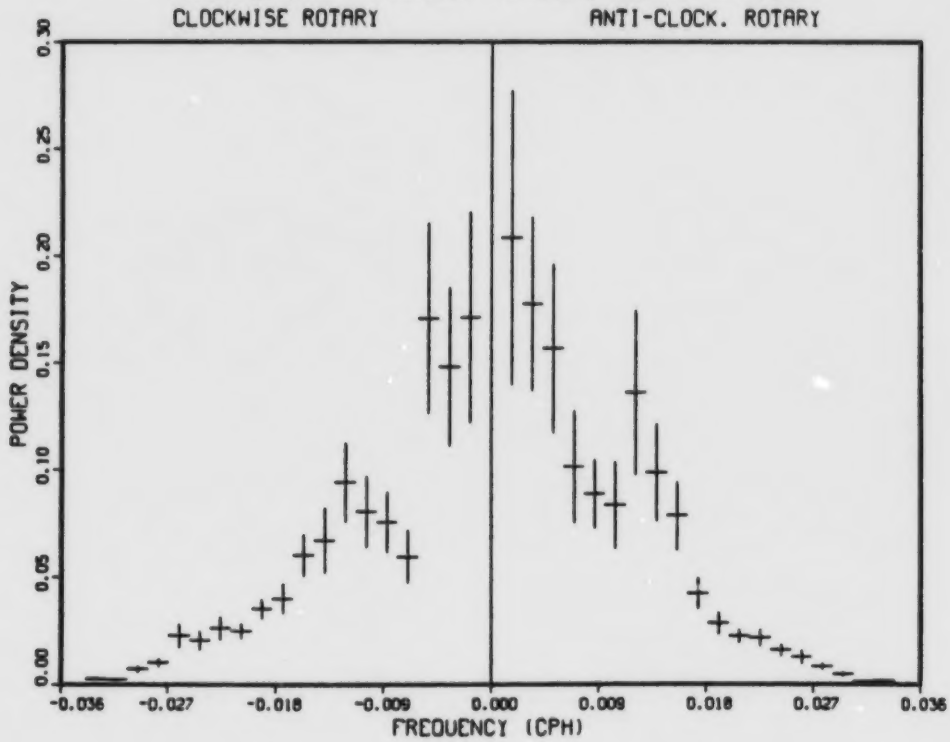
POSITION	55.084 N 54.010 W
BOTTOM DEPTH	1000.0 M
DURATION	364.0 DAYS

		MINIMUM	MAXIMUM	MEAN	STD. DEV.
TEMPERATURE	DEG C	3.13	3.84	3.45	.18
SALINITY		34.92	35.10	35.03	.02
SIGMA-THETA	KG/M**3	27.79	27.93	27.87	.02
N-S COMPONENT	M/S	-.24	.06	-.06	.04
E-W COMPONENT	M/S	-.09	.39	.08	.06
MAJOR AXIS	M/S	-.07	.45	.10	.07
MINOR AXIS	M/S	-.11	.12	-.01	.03

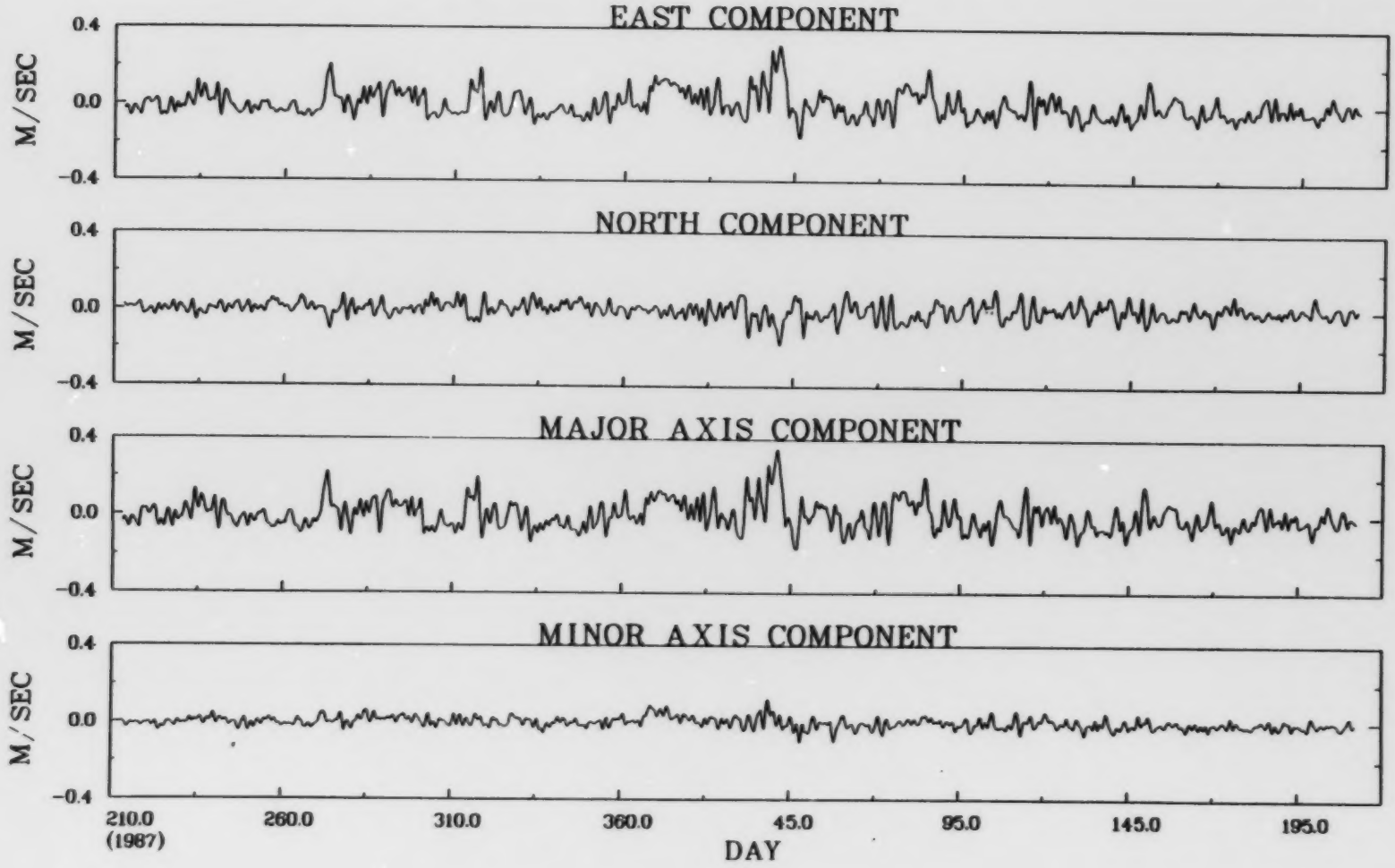
MAJOR AXIS ORIENTATION 32.1 DEGREES TRUE

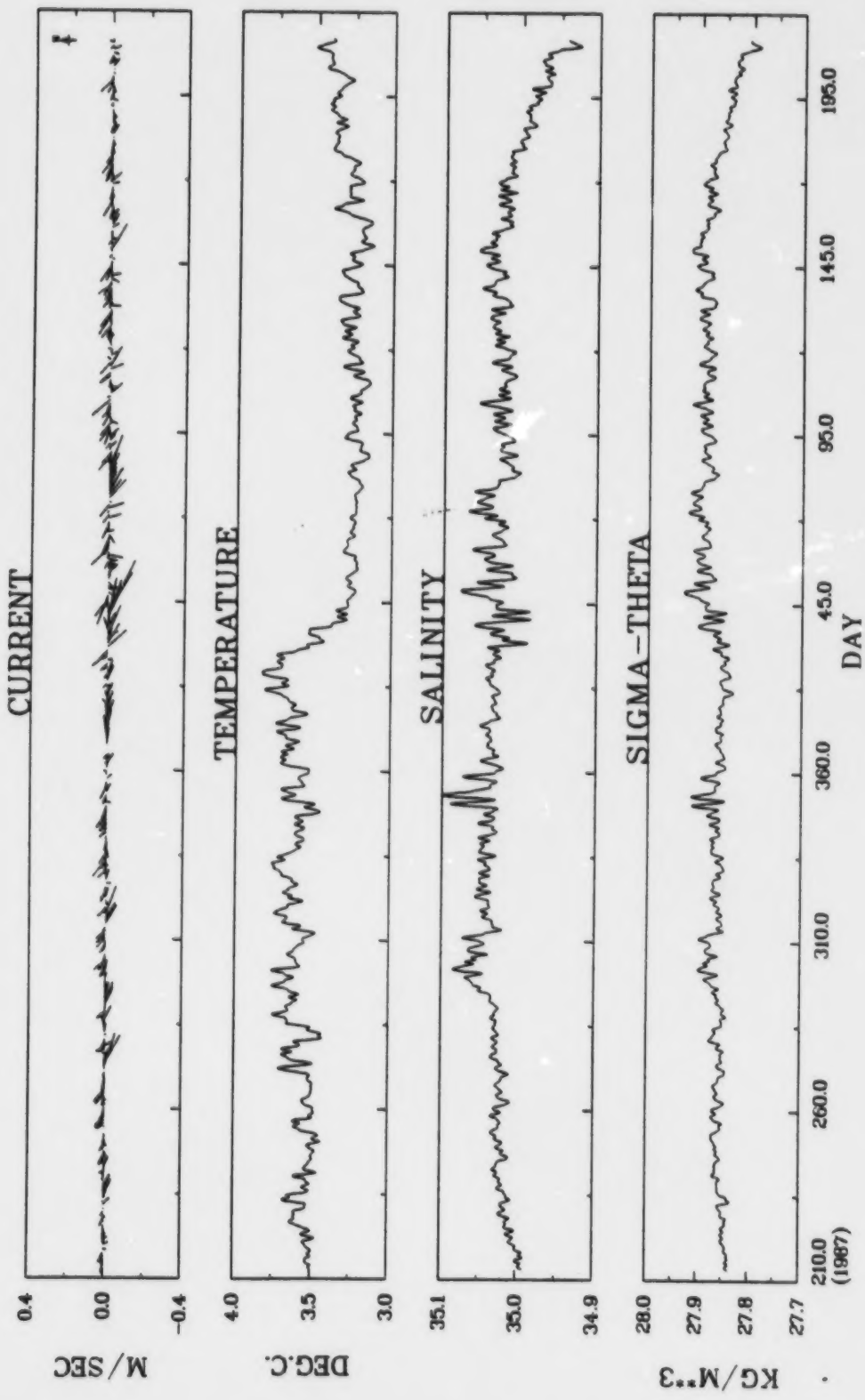
ROTARY SPECTRUM OF TOTAL SIGNAL

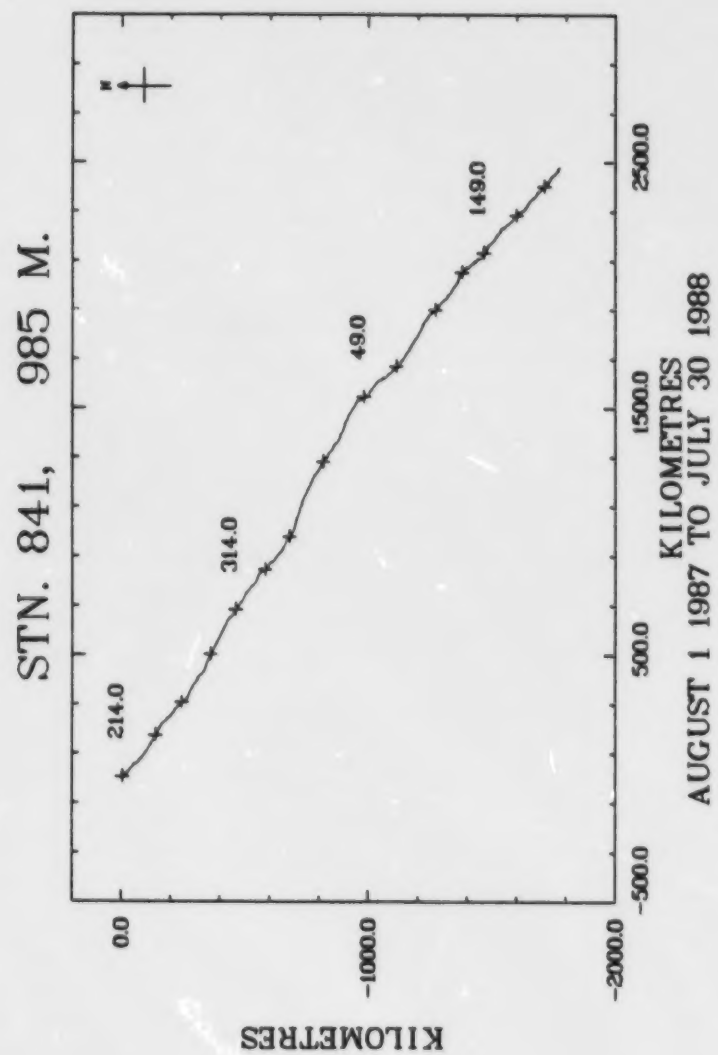
U(841., 985.M.) (M/SEC) x V(841., 985.M.) (M/SEC)



CM(841; 985M) – RESIDUALS
POSITION 55.084 N 54.010 W




CURRENT
M/SEC
0.4
0.0
-0.4
TEMPERATURE
DEG.C.
4.0
3.5
3.0
SALINITY
35.1
35.0
34.9
SIGMA-THETA
KG/M**3
28.0
27.9
27.8
27.7
210.0
(1987)
260.0
310.0
360.0
45.0
95.0
145.0
195.0
DAY


STN. 841, 985 M.
214.0
314.0
49.0
149.0
0.0
-1000.0
-2000.0
-500.0
500.0
1500.0
2500.0
KILOMETRES
KILOMETRES
AUGUST 1 1987 TO JULY 30 1988

CM(842; 400.M.) - RESIDUAL STATISTICS

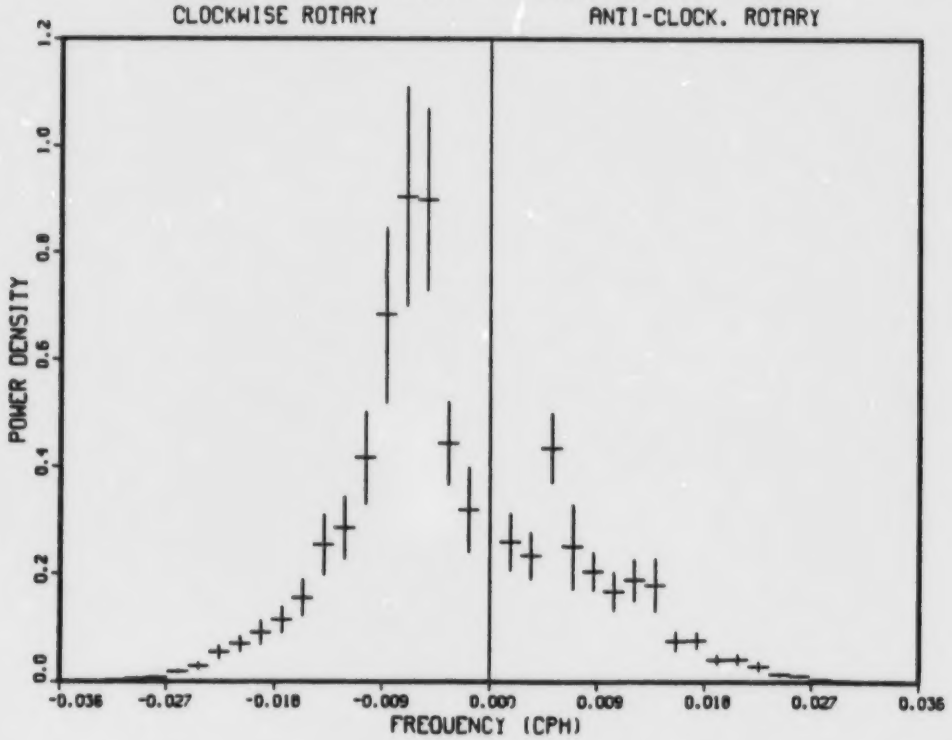
POSITION	55.347 N 53.755 W
BOTTOM DEPTH	2500.0 M
DURATION	327.8 DAYS

		MINIMUM	MAXIMUM	MEAN	STD. DEV.
TEMPERATURE	DEG C	2.97	4.08	3.49	.25
SALINITY		35.00	35.53	35.17	.05
SIGMA-THETA	KG/M**3	27.85	28.28	27.97	.04
N-S COMPONENT	M/S	-.42	.23	-.09	.08
E-W COMPONENT	M/S	-.16	.56	.17	.09
MAJOR AXIS	M/S	-.27	.34	.02	.08
MINOR AXIS	M/S	-.60	.08	-.19	.09

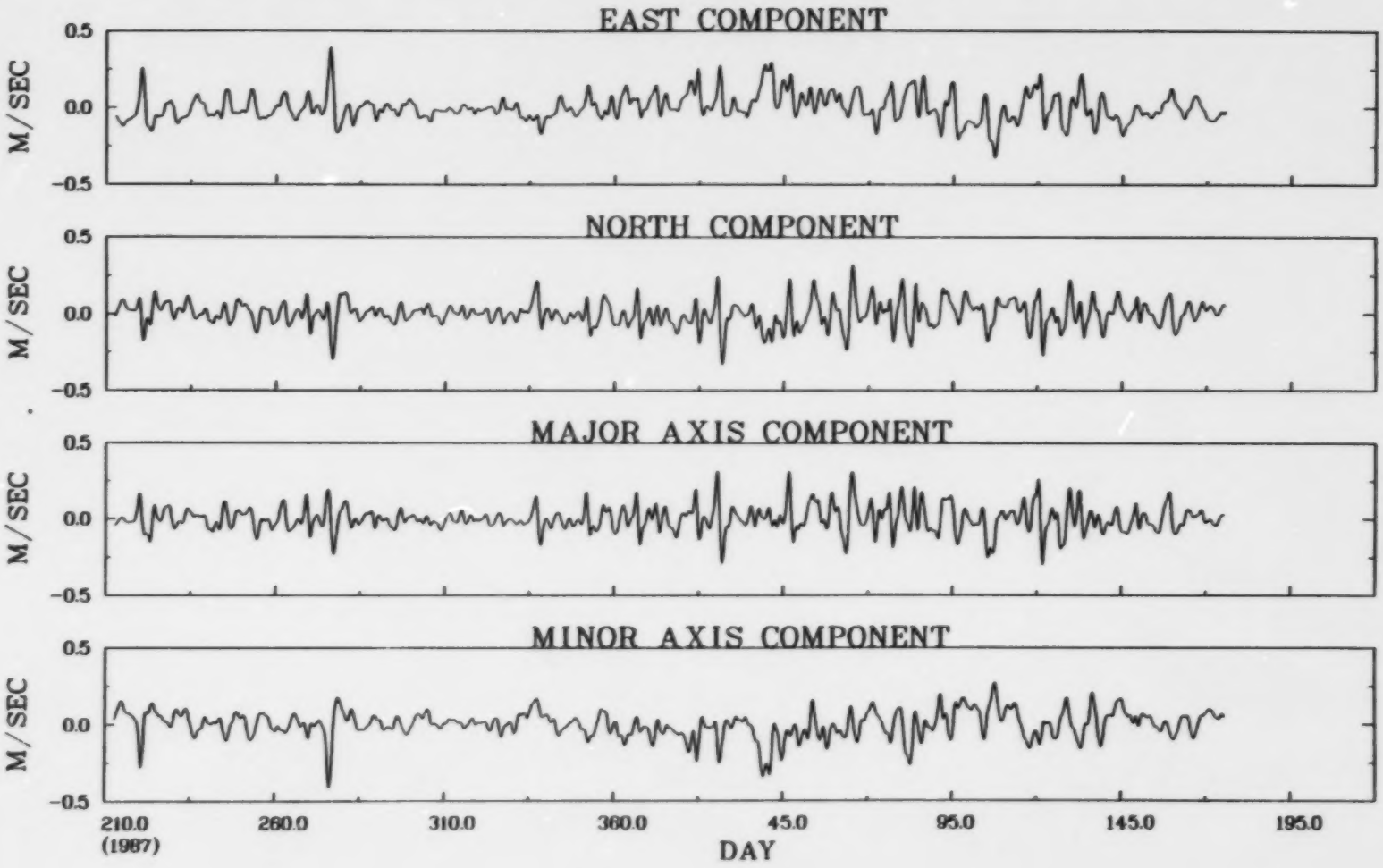
MAJOR AXIS ORIENTATION -55.2 DEGREES TRUE

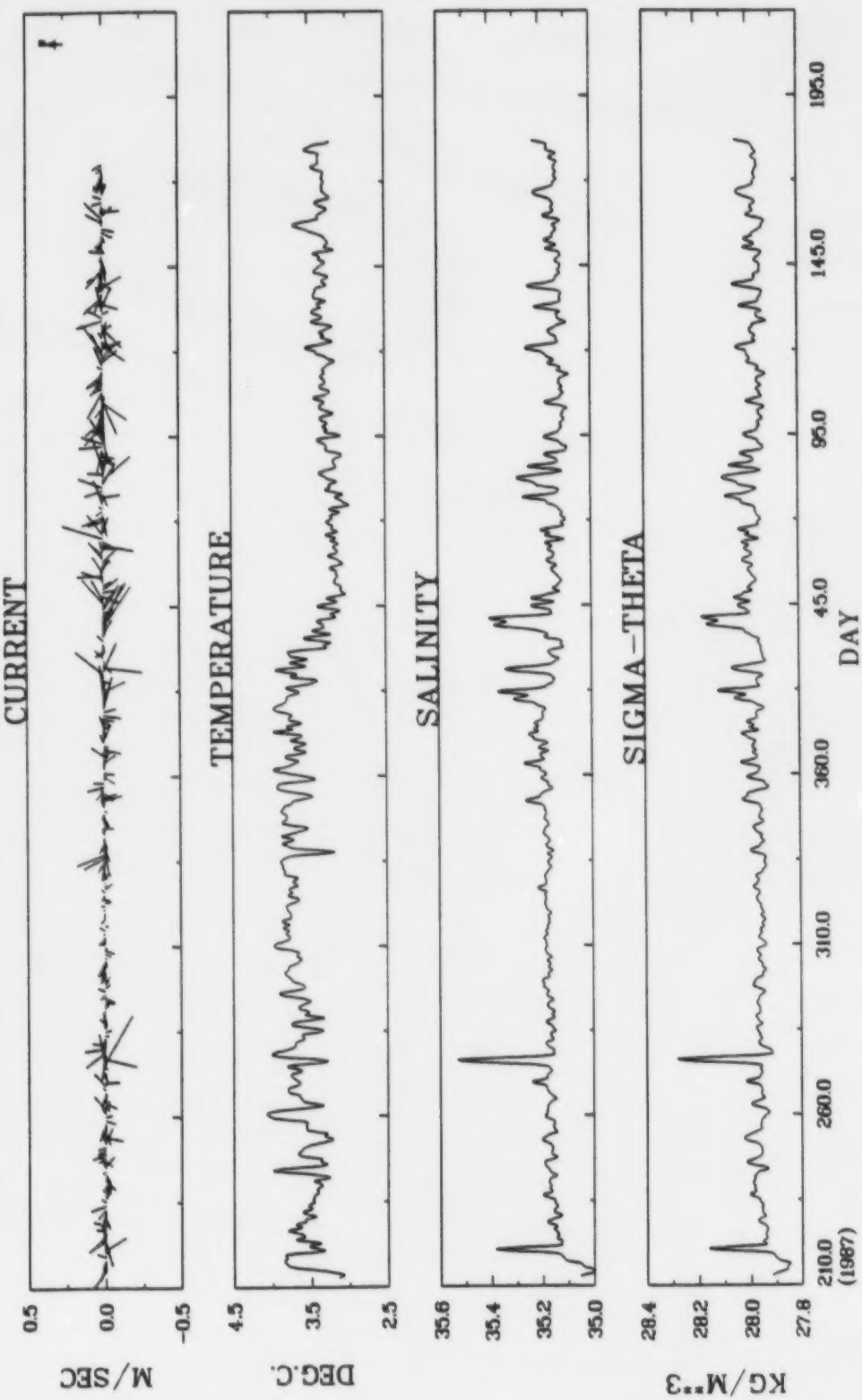
ROTARY SPECTRUM OF TOTAL SIGNAL

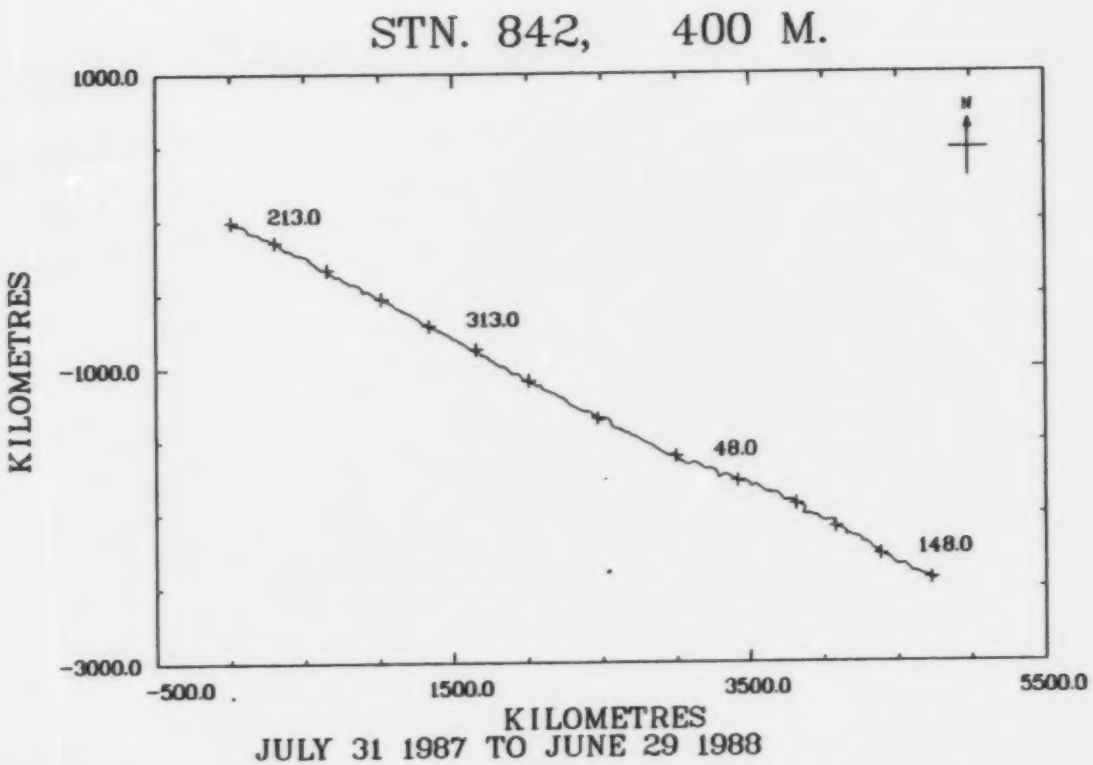
U(842., 400.M.) (M/SEC) + V(842., 400.M.) (M/SEC)



CM(842; 400M) – RESIDUALS
POSITION 55.347 N 53.755 W




CURRENT
TEMPERATURE
SALINITY
SIGMA-THETA
0.5
0.0
-0.5
M/SEC
4.5
3.5
2.5
DEG.C
35.6
35.4
35.2
35.0
28.4
28.2
28.0
27.8
KG/M**3
210.0
(1987)
260.0
310.0
360.0
45.0
95.0
145.0
195.0
DAY


STN. 842, 400 M.
1000.0
-1000.0
-3000.0
KILOMETRES
N
213.0
313.0
48.0
148.0
-500.0
1500.0
3500.0
5500.0
KILOMETRES
JULY 31 1987 TO JUNE 29 1988

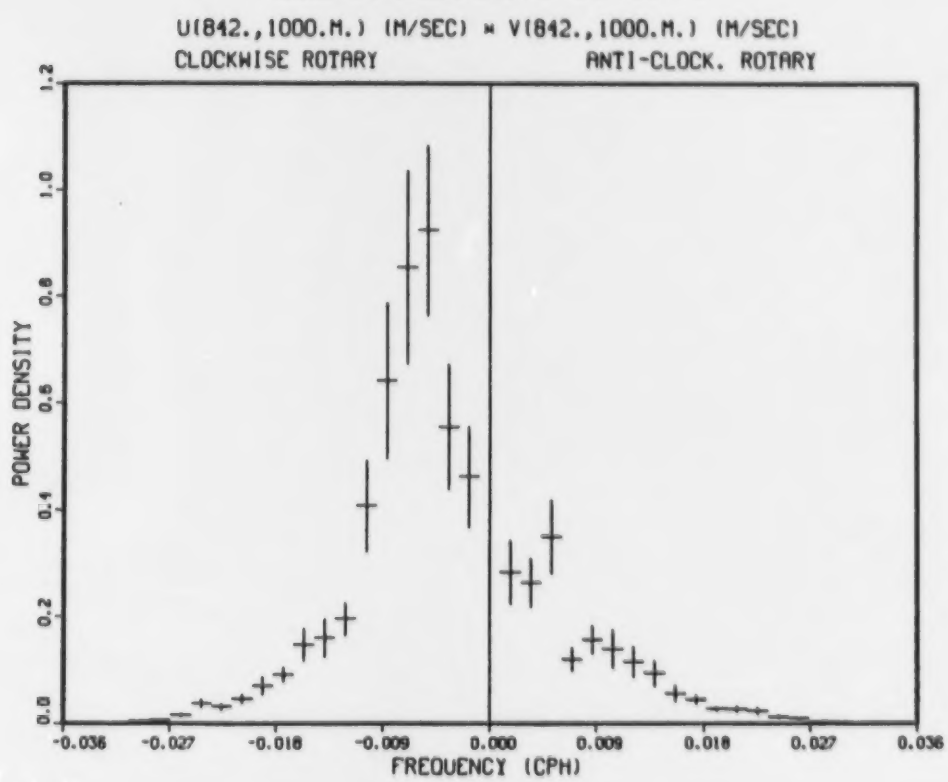
CM(842;1000.M.) - RESIDUAL STATISTICS

POSITION 55.347 N 53.755 W
BOTTOM DEPTH 2500.0 M
DURATION 368.0 DAYS

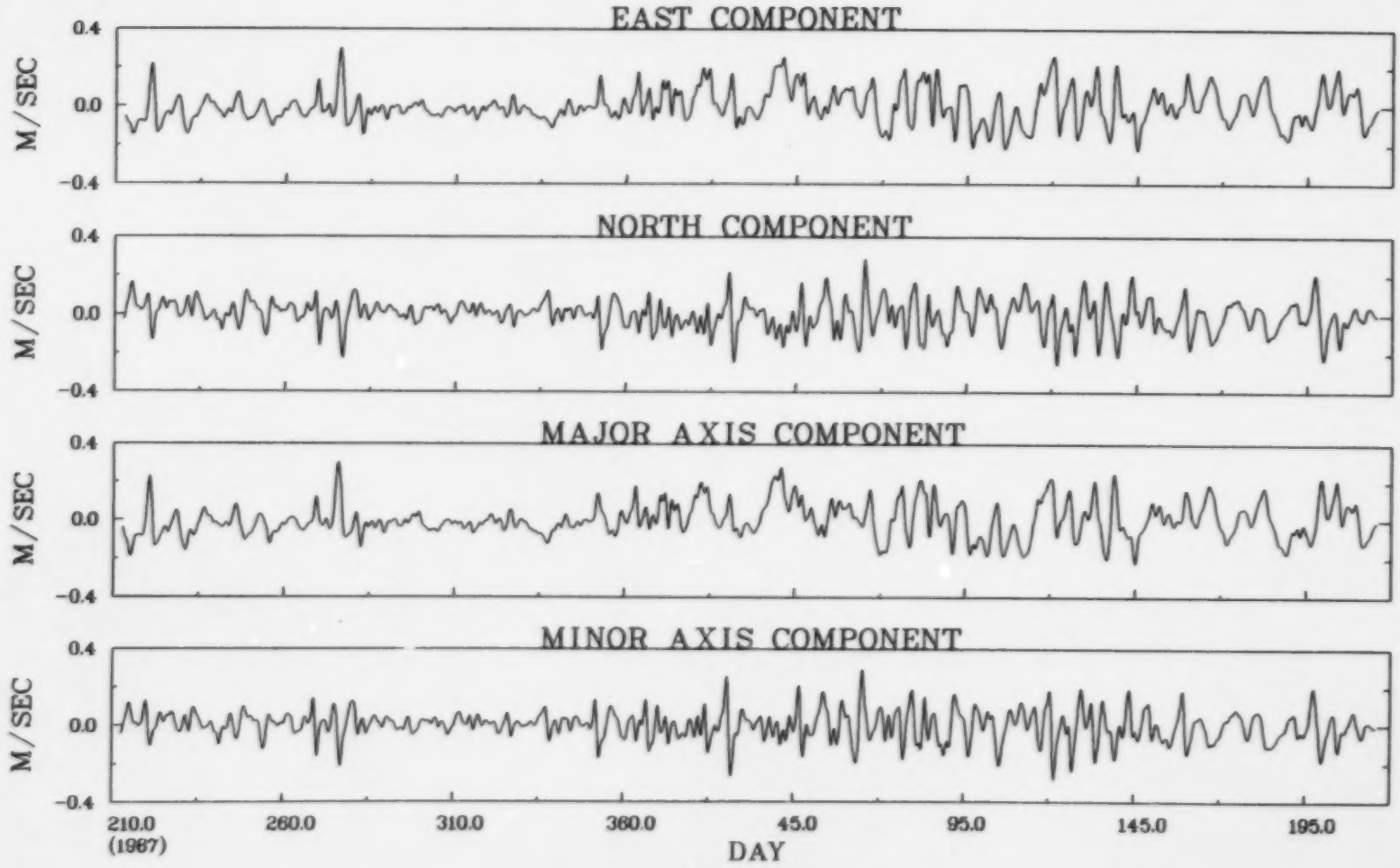
		MINIMUM	MAXIMUM	MEAN	STD. DEV.
TEMPERATURE	DEG C	3.00	3.39	3.19	.08
SALINITY		35.28	36.09	35.49	.09
SIGMA-THETA	KG/M**3	28.11	28.75	28.26	.07
N-S COMPONENT	M/S	-.34	.20	-.09	.08
E-W COMPONENT	M/S	-.06	.47	.17	.09
MAJOR AXIS	M/S	-.04	.49	.18	.09
MINOR AXIS	M/S	-.32	.26	-.04	.07

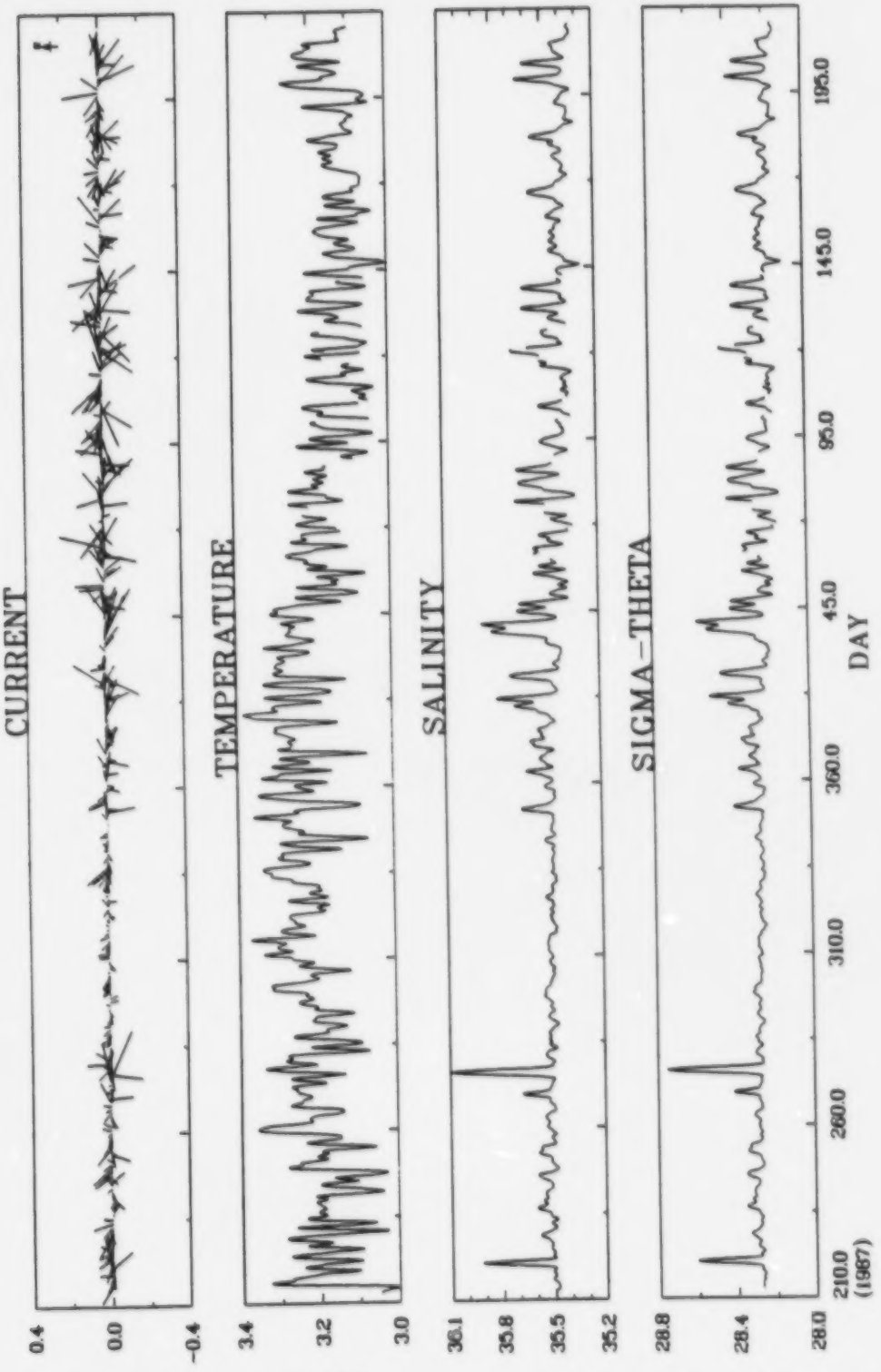
MAJOR AXIS ORIENTATION 16.0 DEGREES TRUE

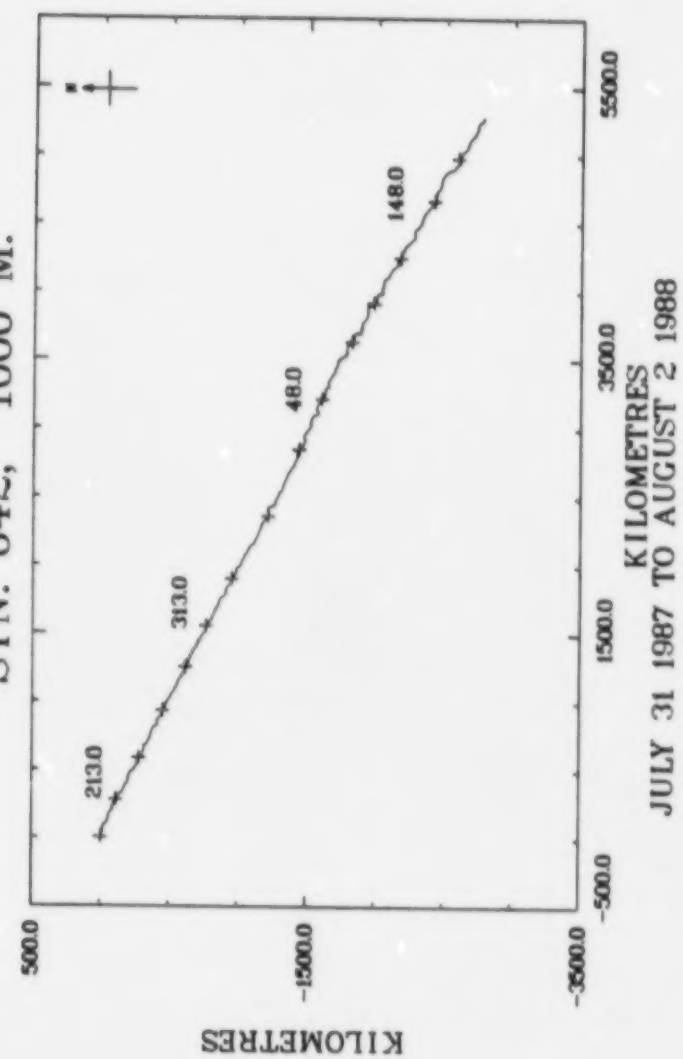
ROTARY SPECTRUM OF TOTAL SIGNAL



CM(842;1000M) – RESIDUALS
POSITION 55.347 N 53.755 W




CURRENT
TEMPERATURE
SALINITY
SIGMA-THETA
M/SEC
DEG.C.
KG/M**3
0.4
0.0
-0.4
3.4
3.2
3.0
36.1
35.8
35.5
35.2
28.8
28.4
28.0
210.0
(1987)
260.0
310.0
360.0
45.0
95.0
145.0
195.0
DAY


STN. 842, 1000 M.
213.0
313.0
48.0
148.0
500.0
-1500.0
-3500.0
-500.0
1500.0
3500.0
5500.0
KILOMETRES
KILOMETRES
JULY 31 1987 TO AUGUST 2 1988

CM(842;2200.M.) - RESIDUAL STATISTICS

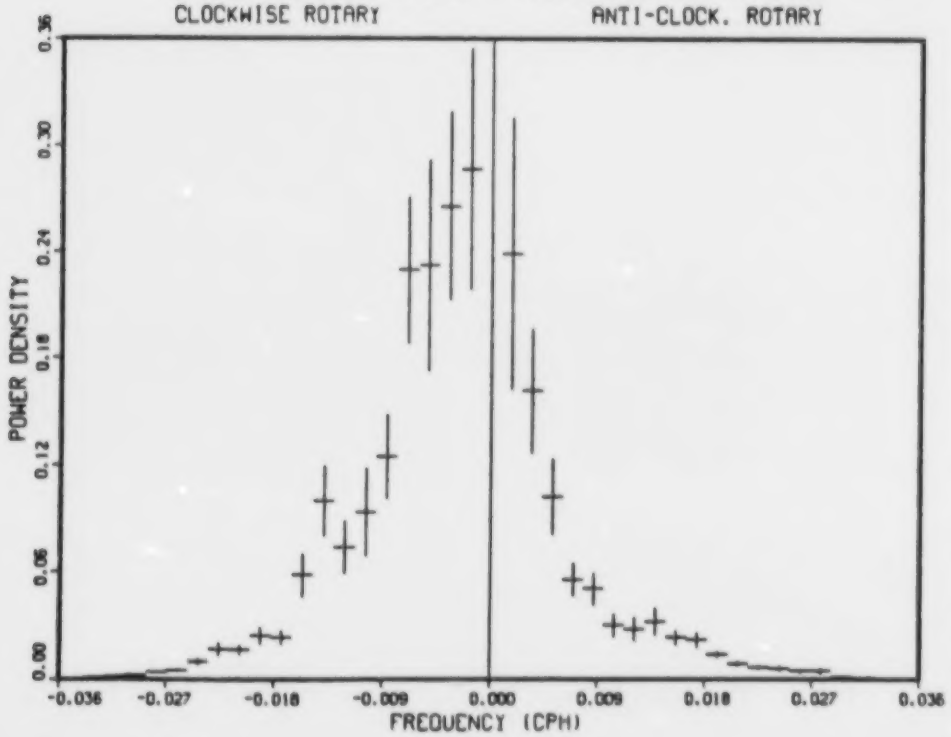
POSITION	55.347 N 53.755 W
BOTTOM DEPTH	2500.0 M
DURATION	368.0 DAYS

		MINIMUM	MAXIMUM	MEAN	STD. DEV.
TEMPERATURE	DEG C	2.18	3.01	2.76	.10
N-S COMPONENT	M/S	-.28	.06	-.08	.04
E-W COMPONENT	M/S	.03	.41	.14	.06
MAJOR AXIS	M/S	.02	.46	.16	.07
MINOR AXIS	M/S	-.12	.16	.00	.03

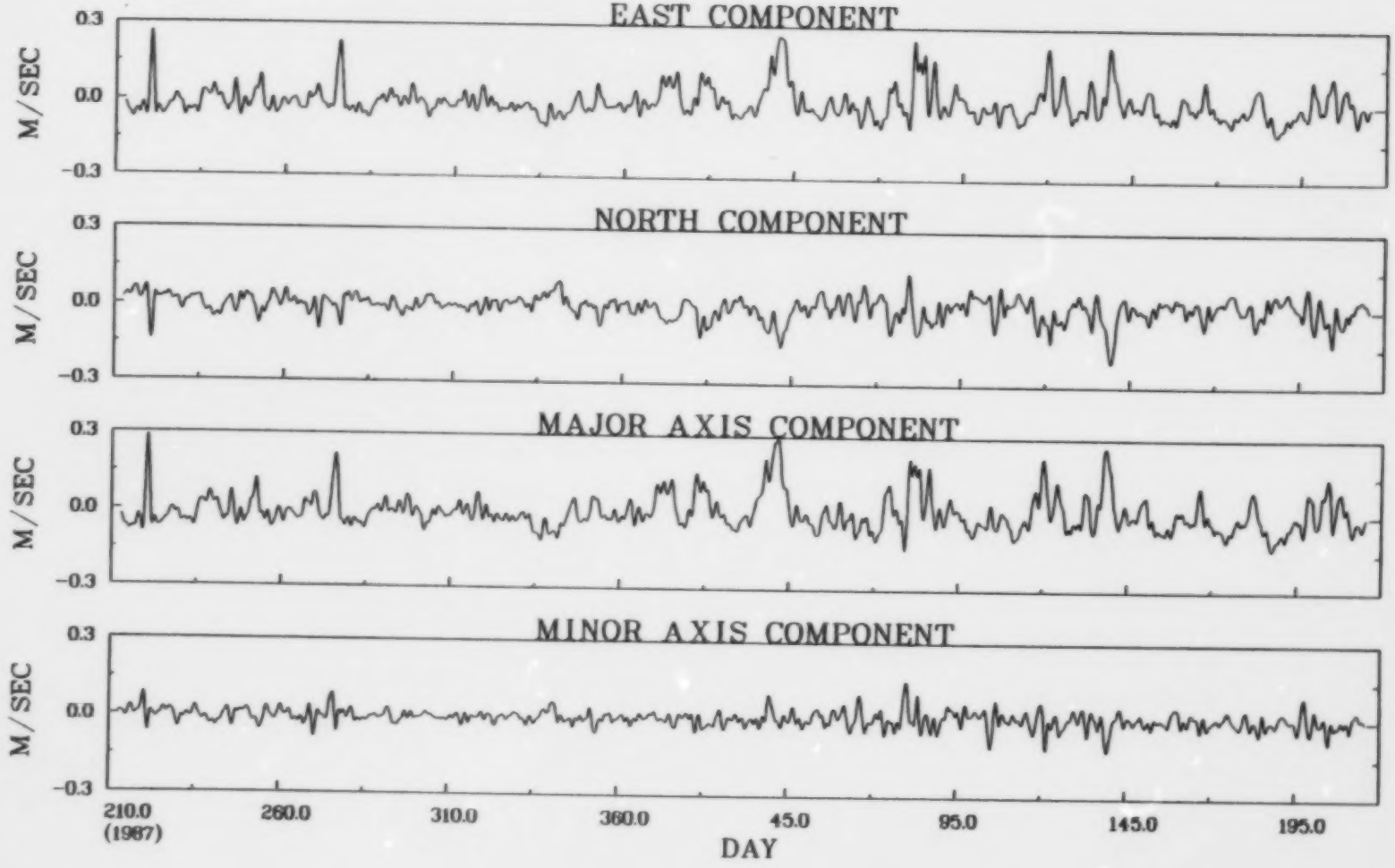
MAJOR AXIS ORIENTATION 30.1 DEGREES TRUE

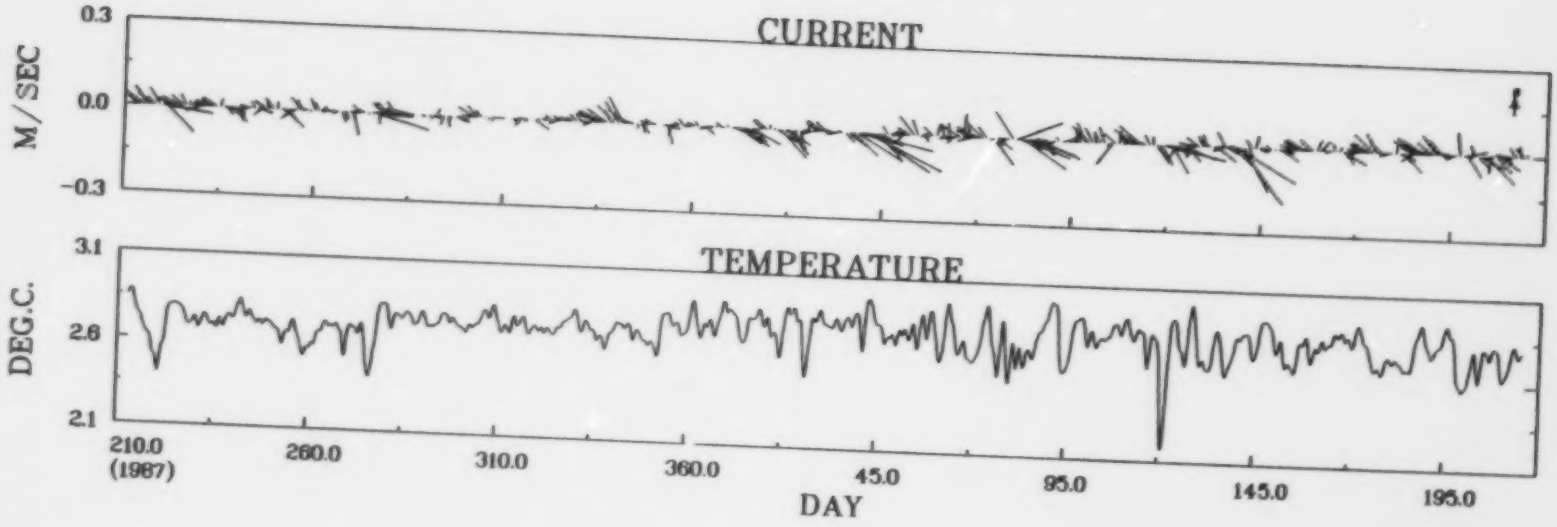
ROTARY SPECTRUM OF TOTAL SIGNAL

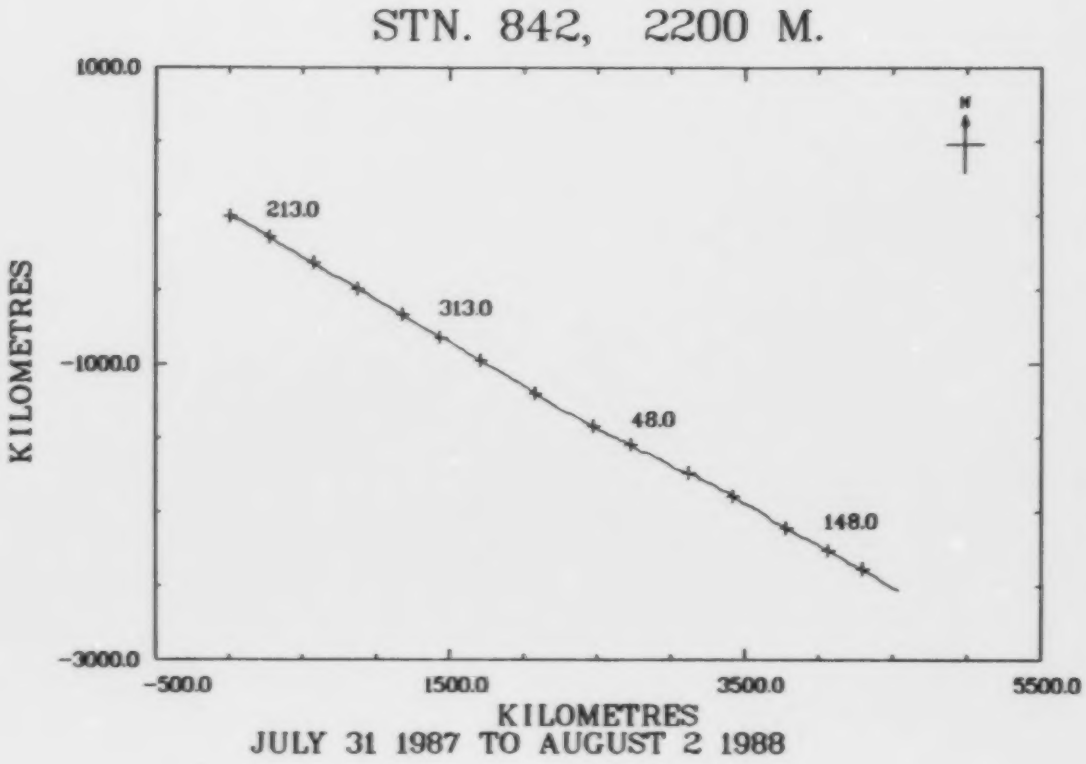
U(842.,2200.M.) (M/SEC) + V(842.,2200.M.) (M/SEC)



CM(842;2200M) – RESIDUALS
POSITION 55.347 N 53.755 W




CURRENT
M/SEC
0.3
0.0
-0.3
TEMPERATURE
DEG.C.
3.1
2.6
2.1
210.0
(1987)
260.0
310.0
360.0
45.0
95.0
145.0
195.0
DAY


STN. 842, 2200 M.
1000.0
-1000.0
-3000.0
KILOMETRES
N
213.0
313.0
48.0
148.0
-500.0
1500.0
3500.0
5500.0
KILOMETRES
JULY 31 1987 TO AUGUST 2 1988

CM(843; 50.M.) - RESIDUAL STATISTICS

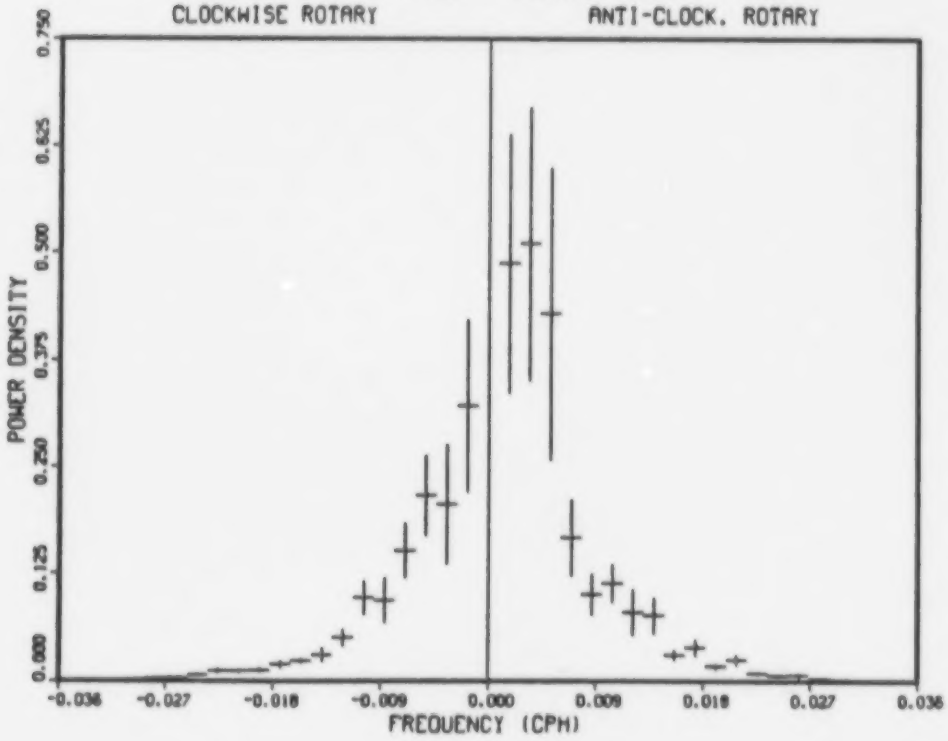
POSITION	56.015 N 52.901 W
BOTTOM DEPTH	3300.0 M
DURATION	368.3 DAYS

		MINIMUM	MAXIMUM	MEAN	STD. DEV.
TEMPERATURE	DEG C	1.69	5.96	3.29	.74
SALINITY		34.47	35.06	34.74	.12
SIGMA-THETA	KG/M**3	27.18	27.93	27.65	.15
N-S COMPONENT	M/S	-.32	.29	.00	.08
E-W COMPONENT	M/S	-.26	.32	-.01	.06
MAJOR AXIS	M/S	-.27	.27	.00	.07
MINOR AXIS	M/S	-.34	.25	.01	.07

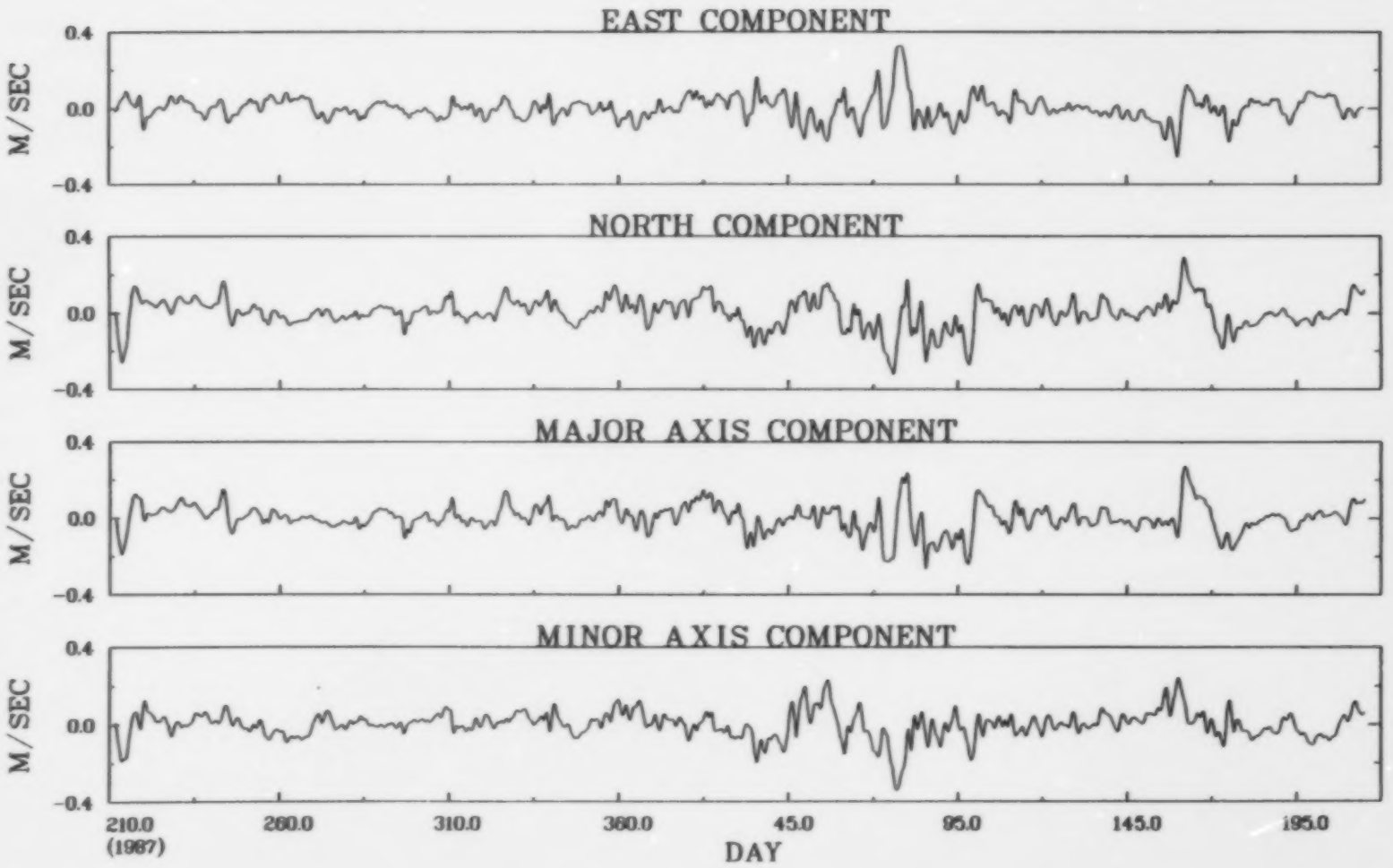
MAJOR AXIS ORIENTATION -55.2 DEGREES TRUE

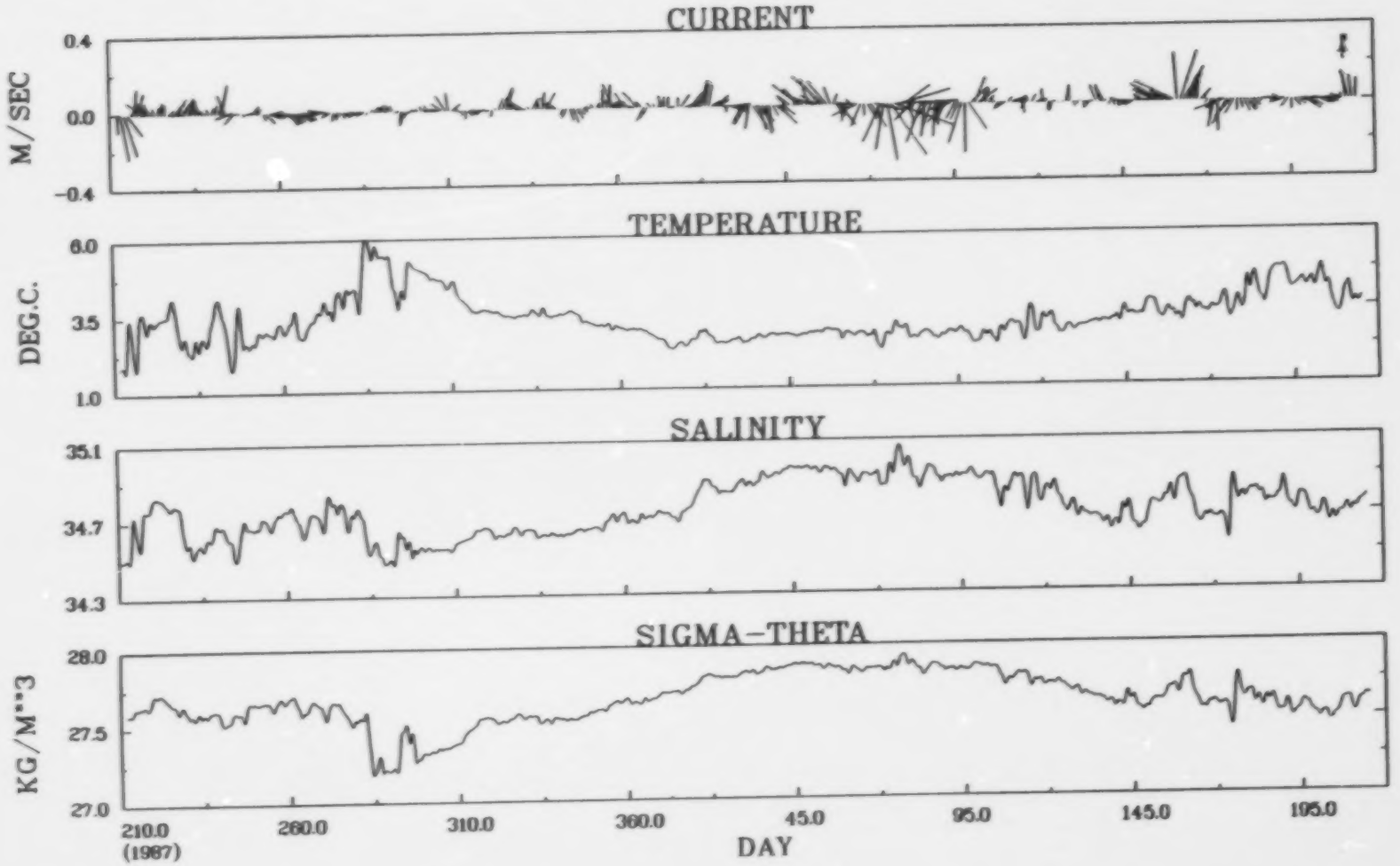
ROTARY SPECTRUM OF TOTAL SIGNAL

U(843., 50.M.) (M/SEC) + V(843., 50.M.) (M/SEC)

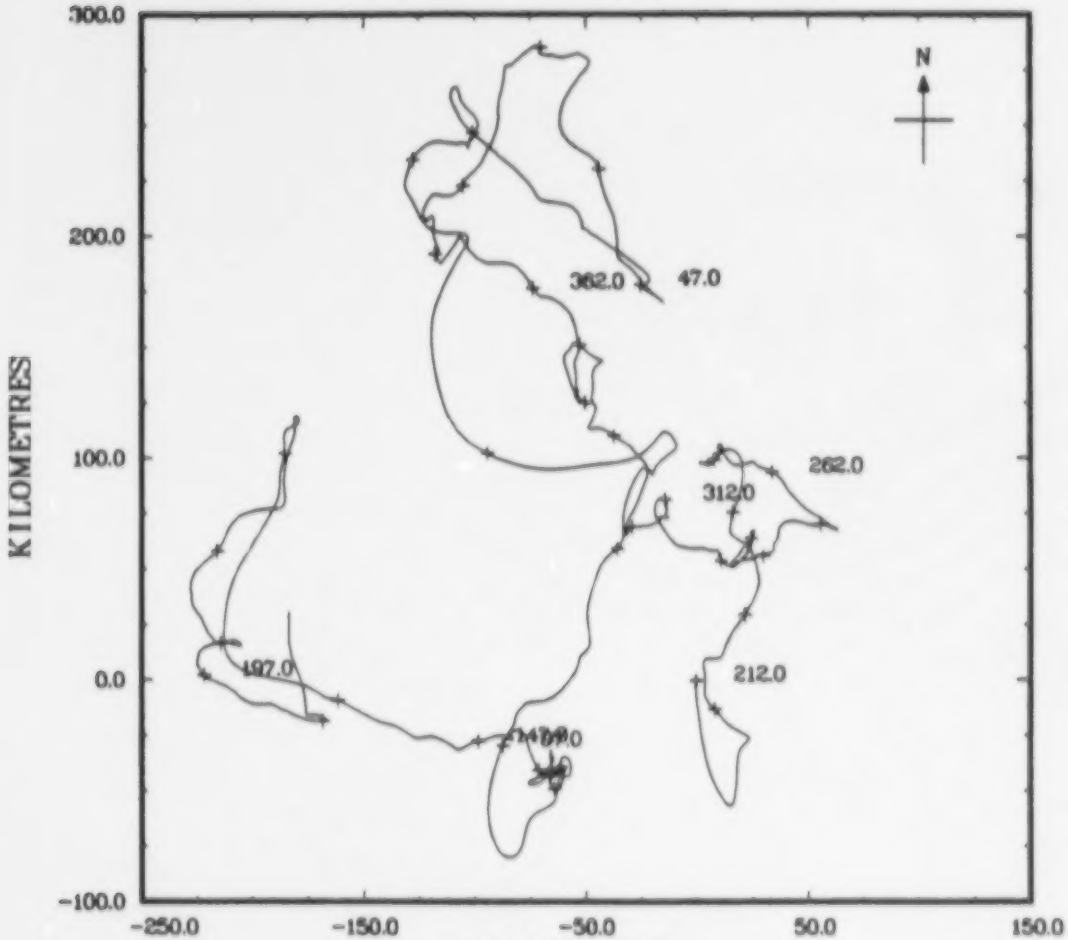


CM(843; 50M) - RESIDUALS
POSITION 56.015 N 52.901 W




CURRENT
M/SEC
0.4
0.0
-0.4
TEMPERATURE
DEG.C.
6.0
3.5
1.0
SALINITY
35.1
34.7
34.3
SIGMA-THETA
KG/M**3
28.0
27.5
27.0
210.0
(1987)
260.0
310.0
360.0
45.0
95.0
145.0
195.0
DAY

STN. 843, 50 M.



KILOMETRES

JULY 30 1987 TO AUGUST 2 1988

CM(843;1000.M.) - RESIDUAL STATISTICS

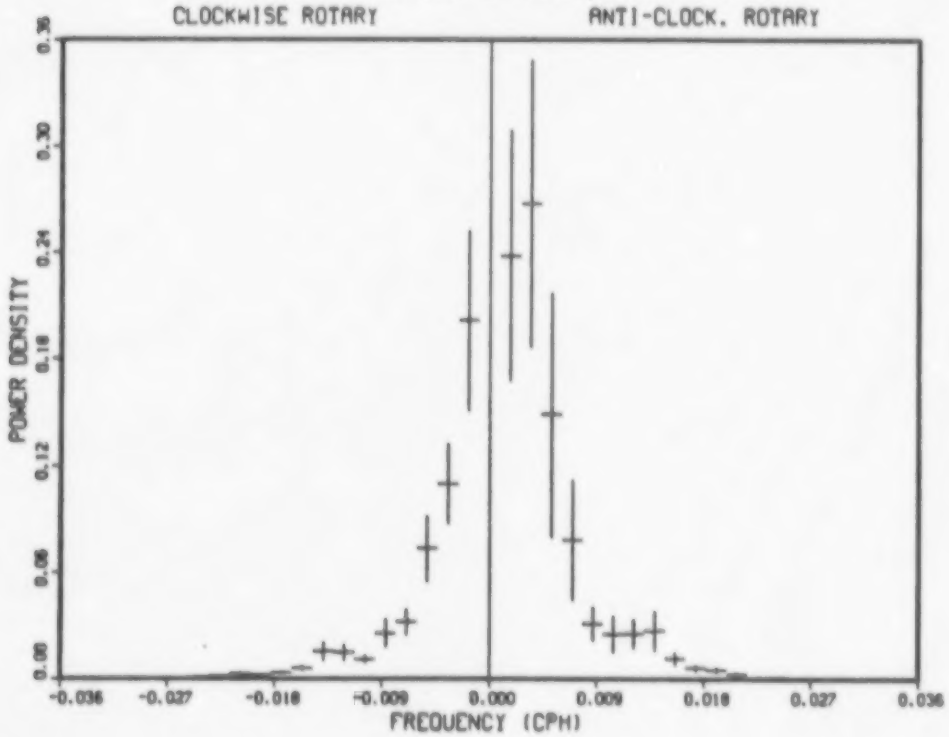
POSITION 56.015 N 52.981 W
BOTTOM DEPTH 3300.0 M
DURATION 368.3 DAYS

		MINIMUM	MAXIMUM	MEAN	STD. DEV.
TEMPERATURE	DEG C	2.98	3.33	3.12	.05
SALINITY		35.03	35.19	35.08	.02
SIGMA-THETA	KG/M**3	27.91	28.03	27.94	.01
N-S COMPONENT	M/S	-.23	.17	.00	.05
E-W COMPONENT	M/S	-.16	.29	.00	.04
MAJOR AXIS	M/S	-.18	.20	.00	.05
MINOR AXIS	M/S	-.26	.17	.00	.05

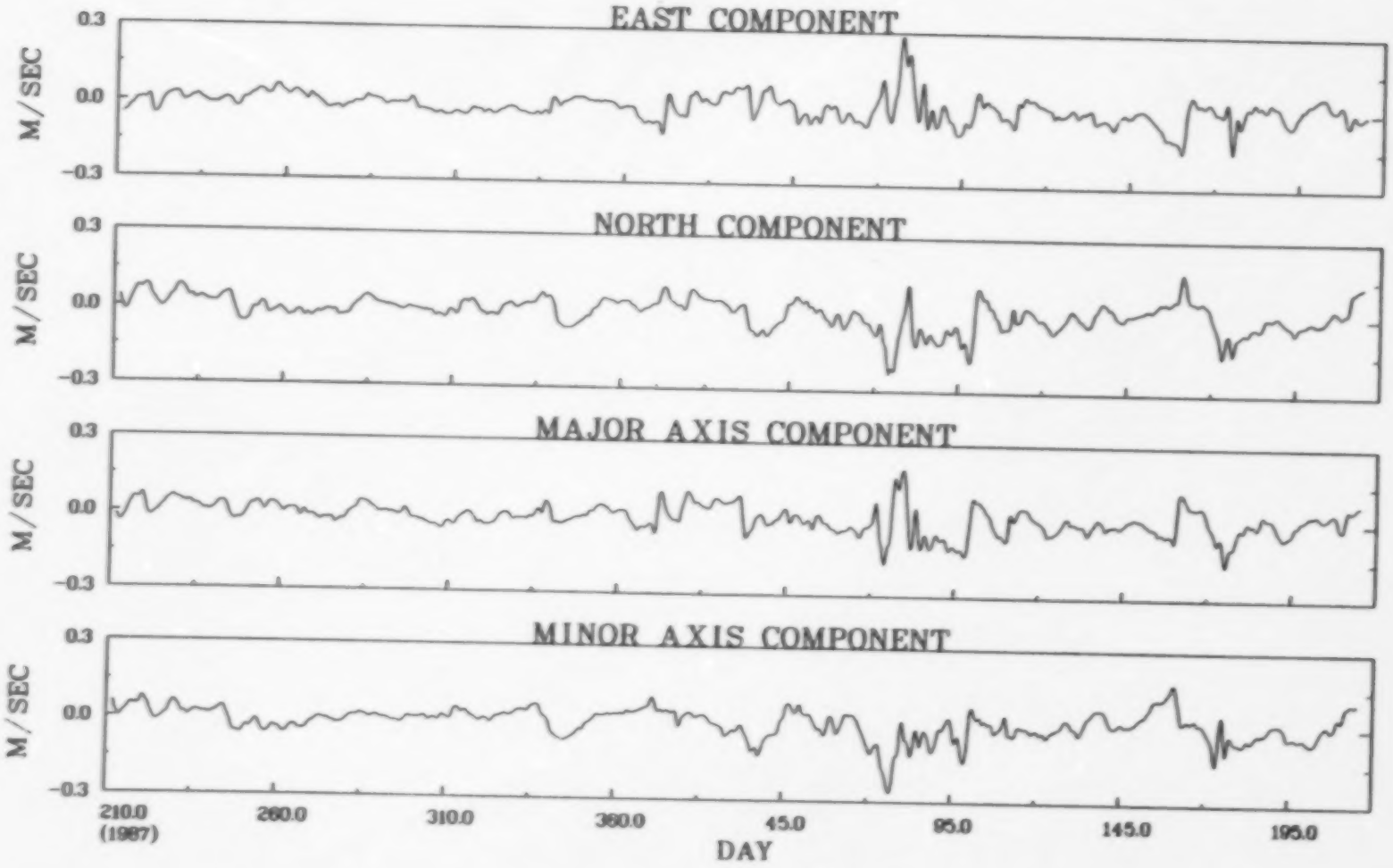
MAJOR AXIS ORIENTATION -39.4 DEGREES TRUE

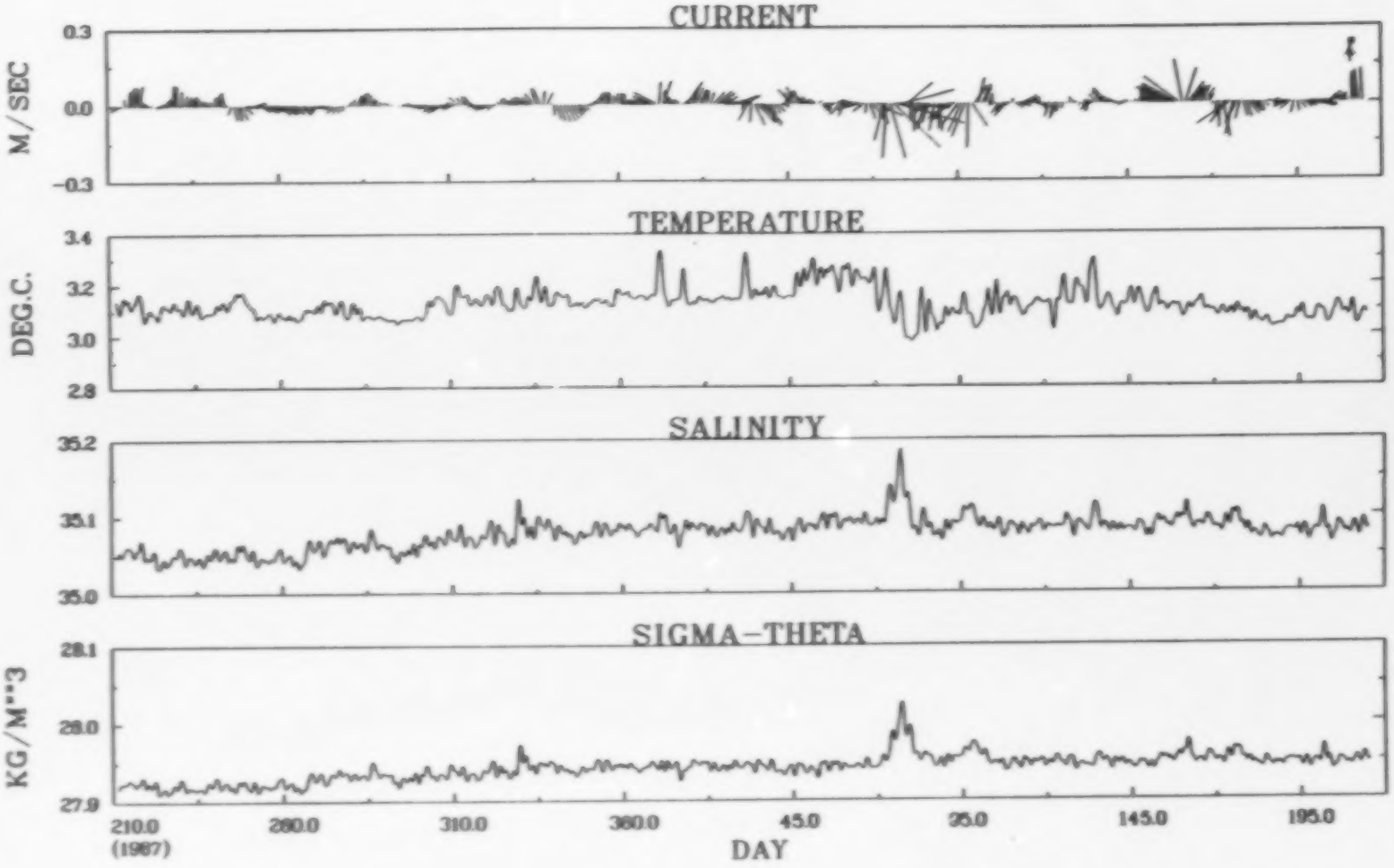
ROTARY SPECTRUM OF TOTAL SIGNAL

U(843.,1000.M.) (M/SEC) + V(843.,1000.M.) (M/SEC)

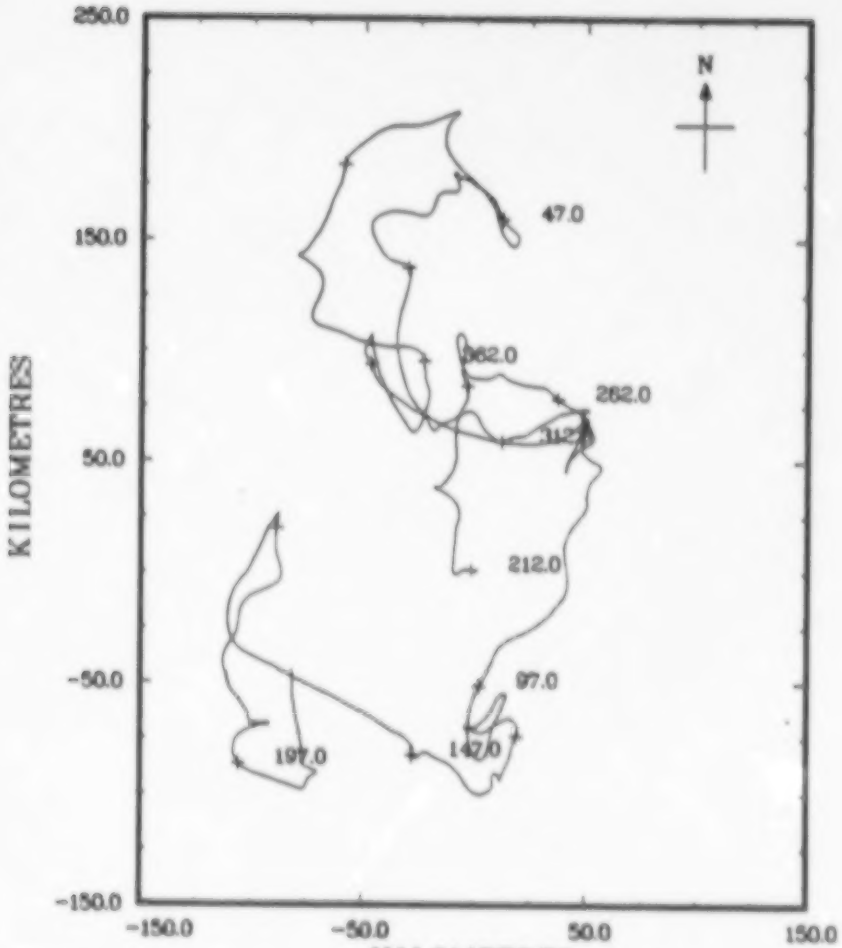


CM(843;1000M) - RESIDUALS
POSITION 56.015 N 52.901 W




CURRENT
M/SEC
0.3
0.0
-0.3
TEMPERATURE
DEG.C.
3.4
3.2
3.0
2.8
SALINITY
35.2
35.1
35.0
SIGMA-THETA
KG/M**3
28.1
28.0
27.9
210.0
(1987)
260.0
310.0
360.0
45.0
95.0
145.0
195.0
DAY

STN. 843, 1000 M.



JULY 30 1987 TO AUGUST 2 1988

CM(843;2200.M.) - RESIDUAL STATISTICS

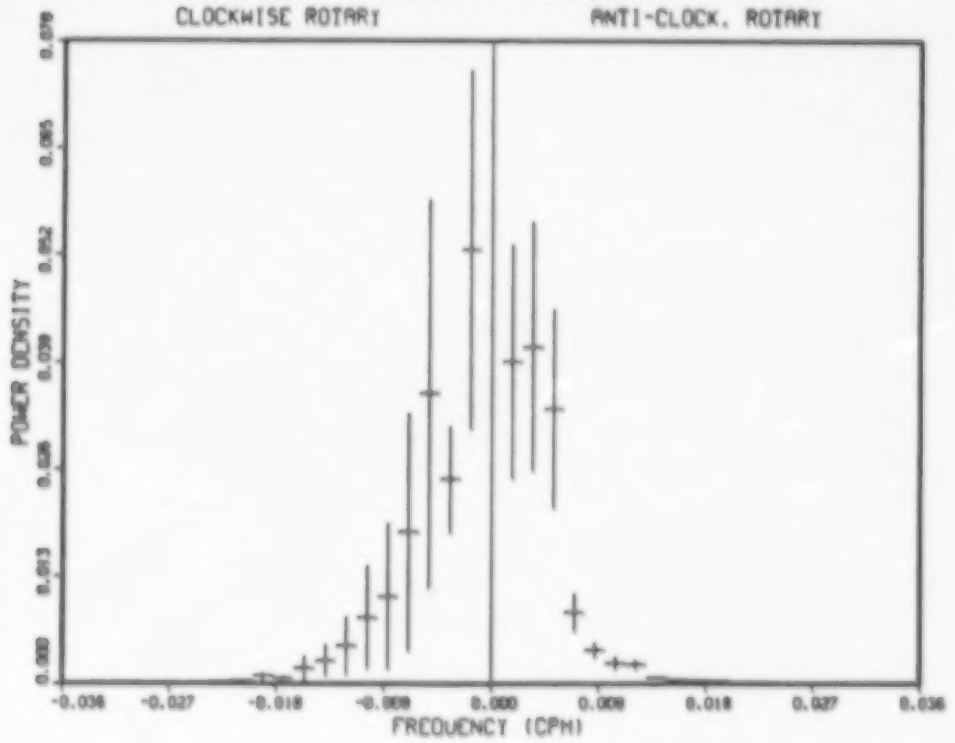
POSITION 56.015 N 52.901 W
BOTTOM DEPTH 3300.0 M
DURATION 166.0 DAYS

		MINIMUM	MAXIMUM	MEAN	STD. DEV.
TEMPERATURE	DEG C	3.10	3.25	3.10	.03
N-S COMPONENT	M/S	-.11	.08	.00	.03
E-W COMPONENT	M/S	-.11	.06	.00	.03
MAJOR AXIS	M/S	-.08	.10	.00	.03
MINOR AXIS	M/S	-.11	.06	.00	.03

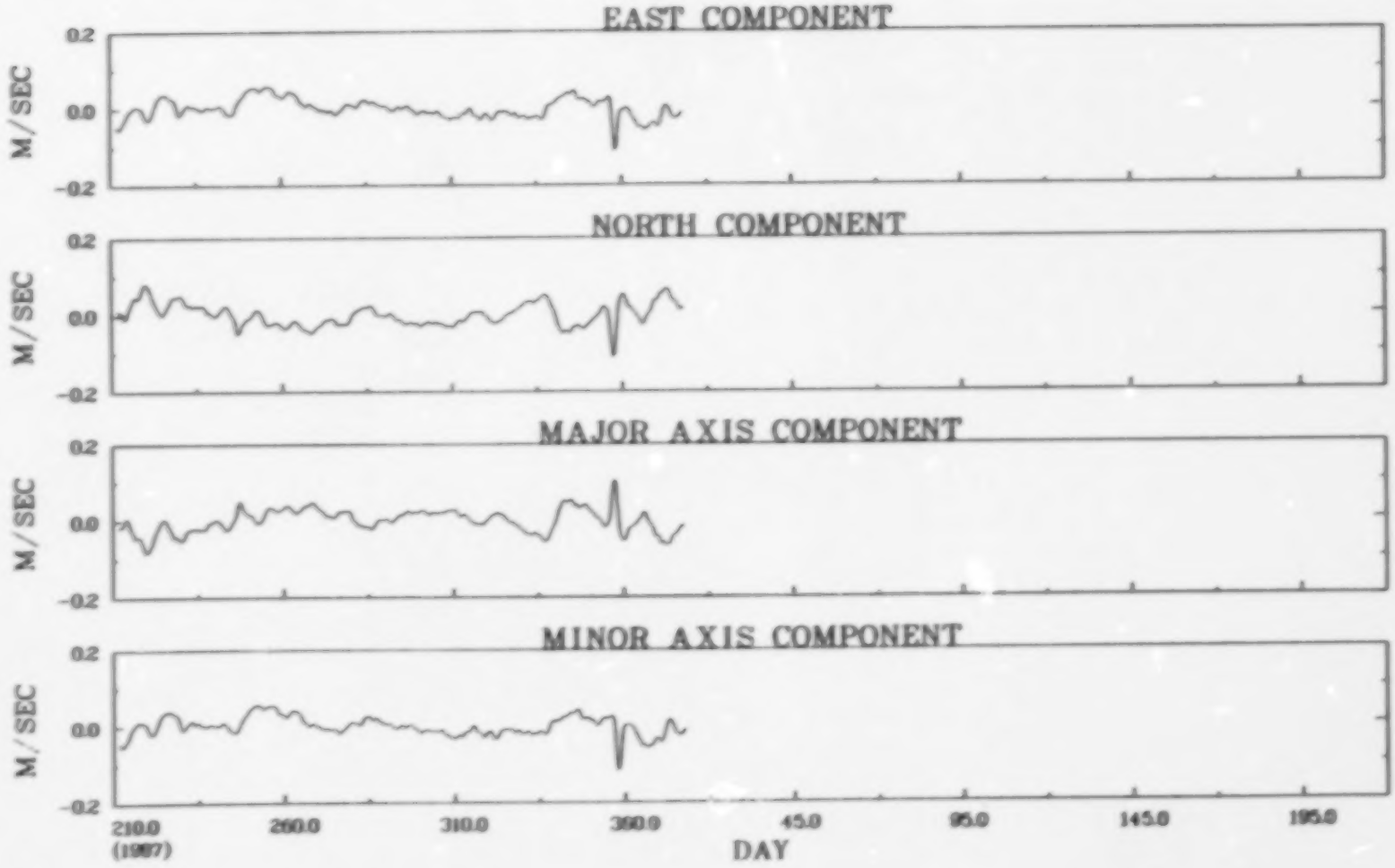
MAJOR AXIS ORIENTATION 82.3 DEGREES TRUE

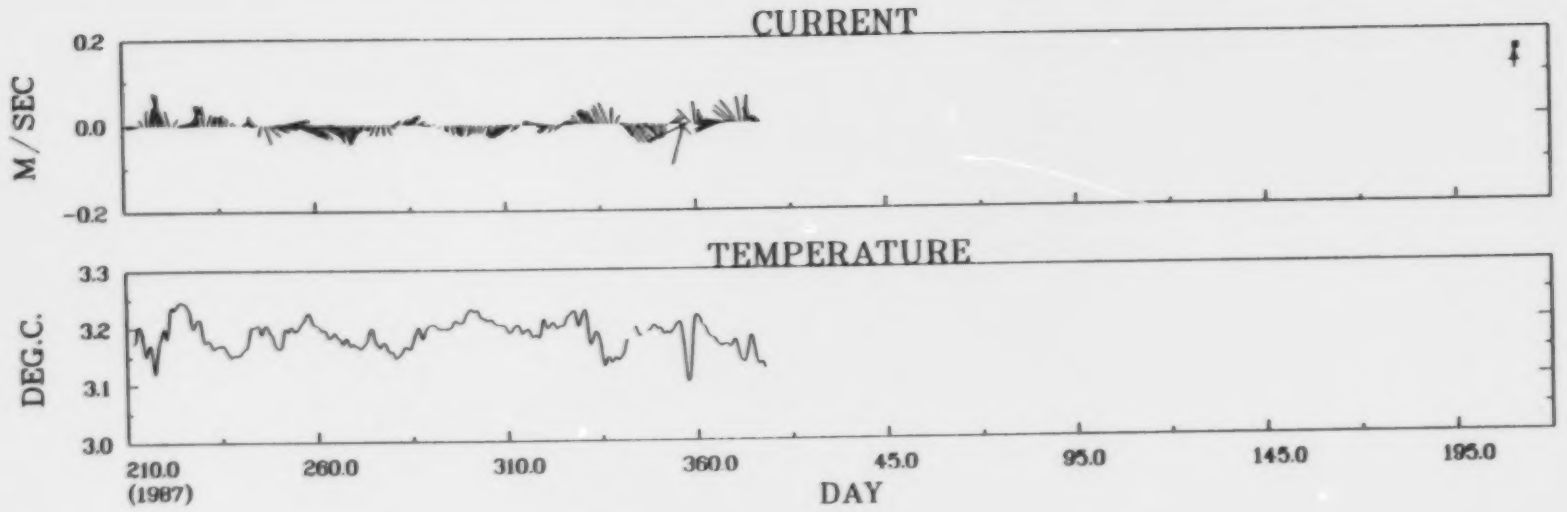
ROTARY SPECTRUM OF TOTAL SIGNAL

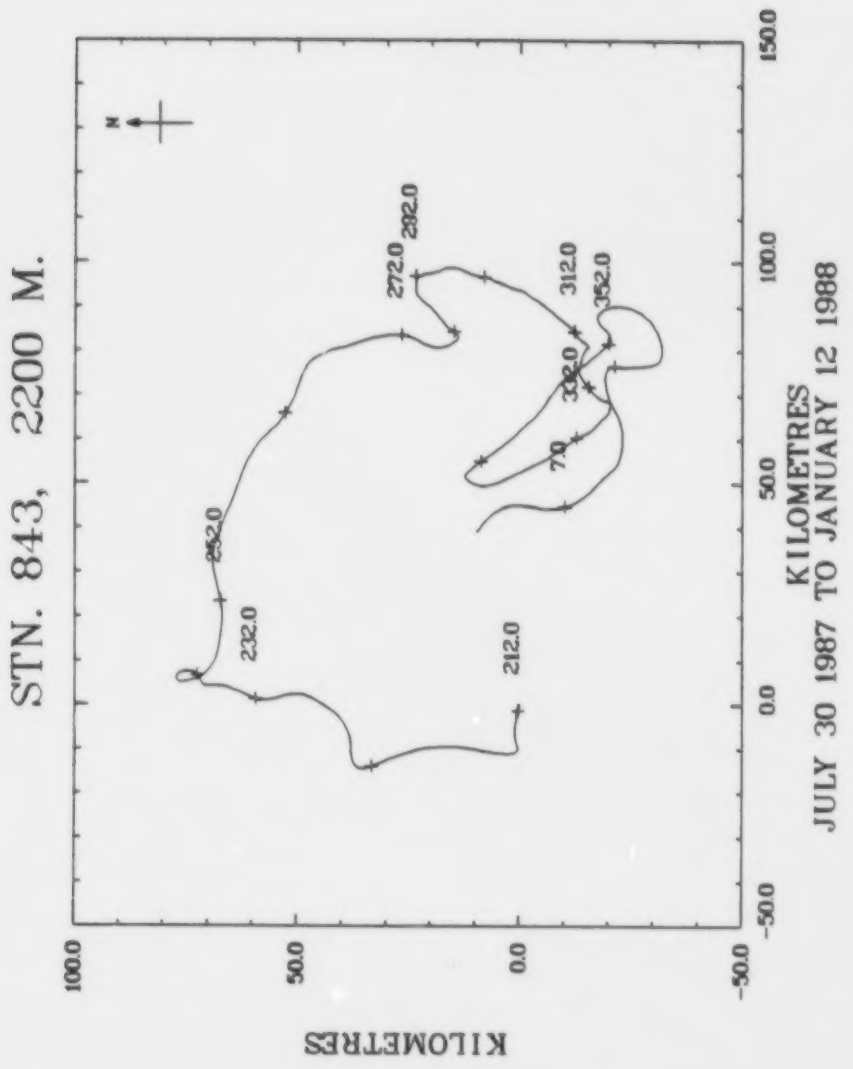
U(843.,2200.M.) (M/SEC) - V(843.,2200.M.) (M/SEC)



CM(843;2200M) - RESIDUALS
POSITION 56.015 N 52.901 W




CURRENT
M/SEC
0.2
0.0
-0.2
TEMPERATURE
DEG.C.
3.3
3.2
3.1
3.0
210.0
(1987)
260.0
310.0
360.0
45.0
95.0
145.0
195.0
DAY


STN. 843, 2200 M.
N
212.0
232.0
252.0
272.0
292.0
312.0
332.0
352.0
70
100.0
50.0
0.0
-50.0
-50.0
0.0
50.0
100.0
150.0
KILOMETRES
KILOMETRES
JULY 30 1987 TO JANUARY 12 1988

CM(843;2800.M.) - RESIDUAL STATISTICS

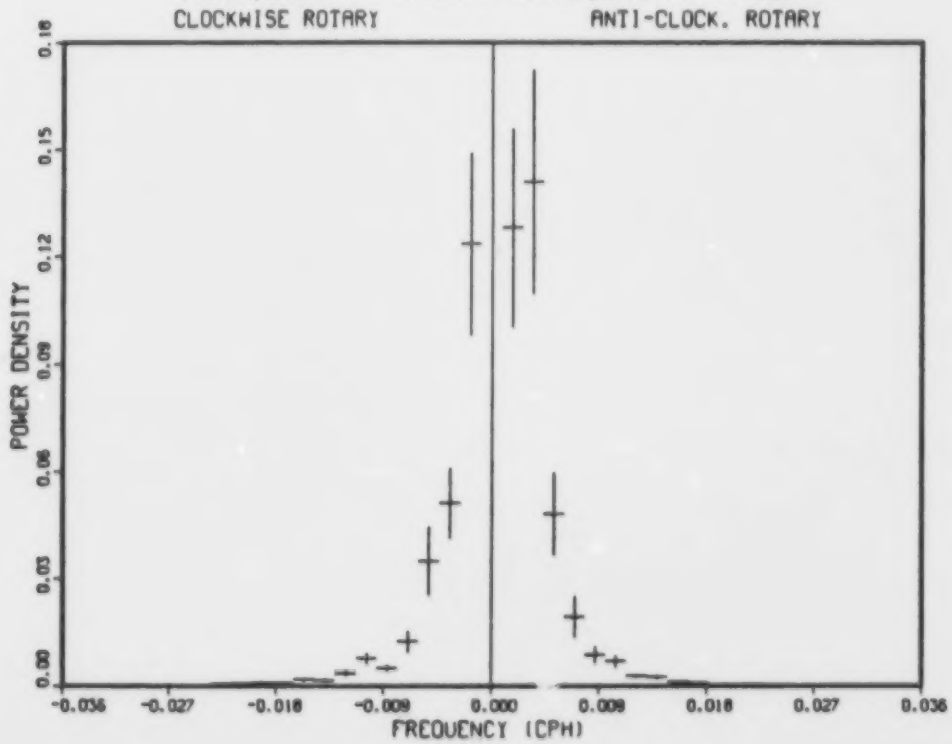
POSITION 56.015 N 52.901 W
BOTTOM DEPTH 3300.0 M
DURATION 368.3 DAYS

		MINIMUM	MAXIMUM	MEAN	STD. DEV.
TEMPERATURE	DEG C	2.45	2.82	2.67	.05
N-S COMPONENT	M/S	-.15	.09	-.01	.04
E-W COMPONENT	M/S	-.07	.19	.03	.03
MAJOR AXIS	M/S	-.09	.17	.02	.04
MINOR AXIS	M/S	-.08	.18	.02	.03

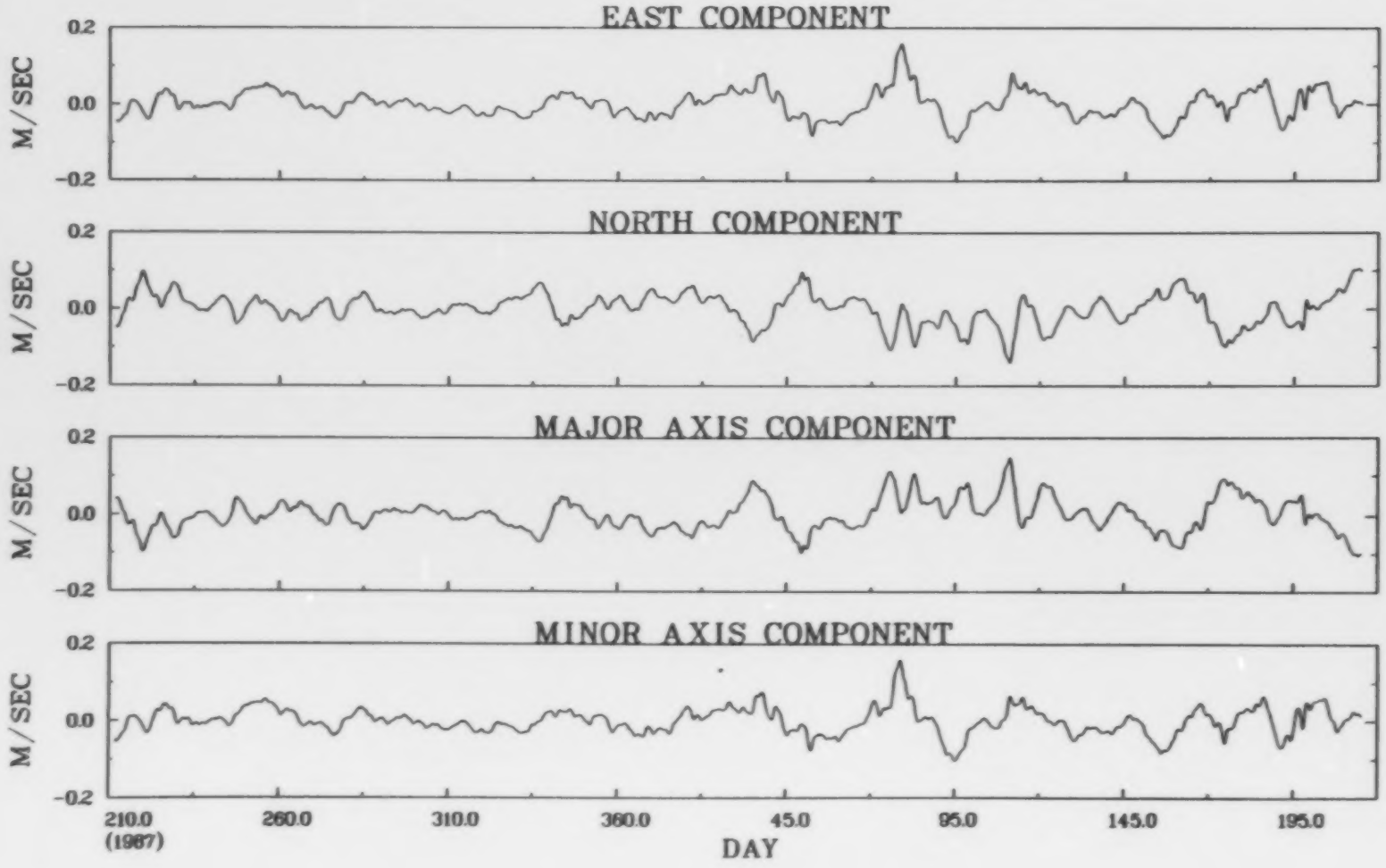
MAJOR AXIS ORIENTATION 82.2 DEGREES TRUE

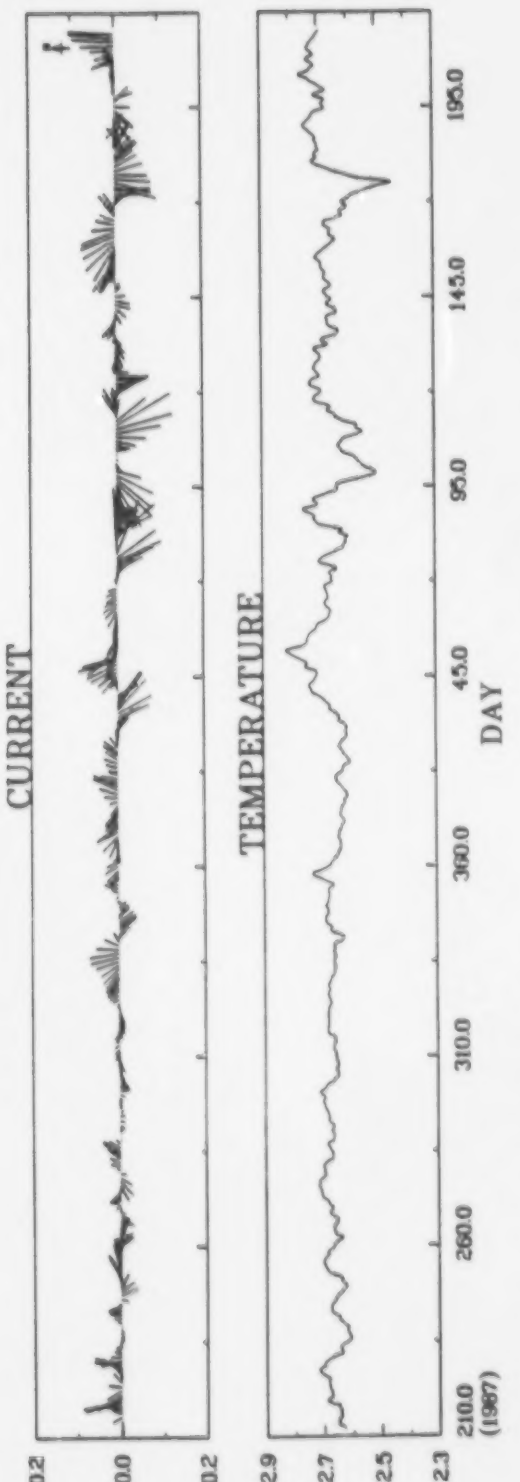
ROTARY SPECTRUM OF TOTAL SIGNAL

U(843.,2800.M.) (M/SEC) + V(843.,2800.M.) (M/SEC)

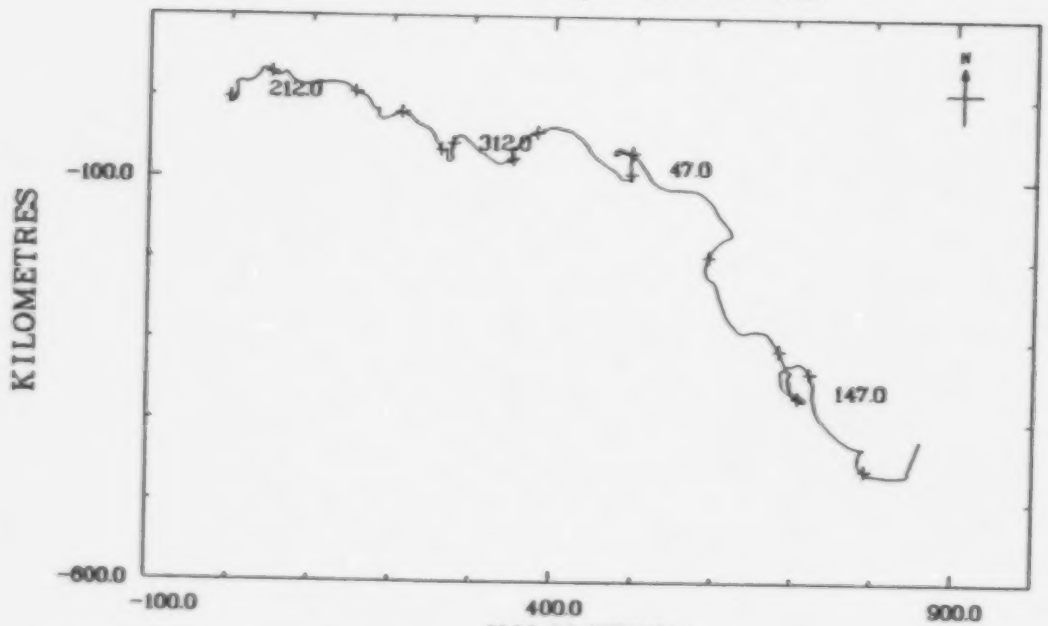


CM(843;2800M) - RESIDUALS
POSITION 56.015 N 52.901 W




CURRENT
0.2
0.0
-0.2
M/SEC
TEMPERATURE
2.9
2.7
2.5
2.3
DEG.C.
210.0
(1987)
260.0
310.0
360.0
45.0
95.0
145.0
195.0
DAY

STN. 843, 2800 M.



JULY 30 1987 TO AUGUST 2 1988

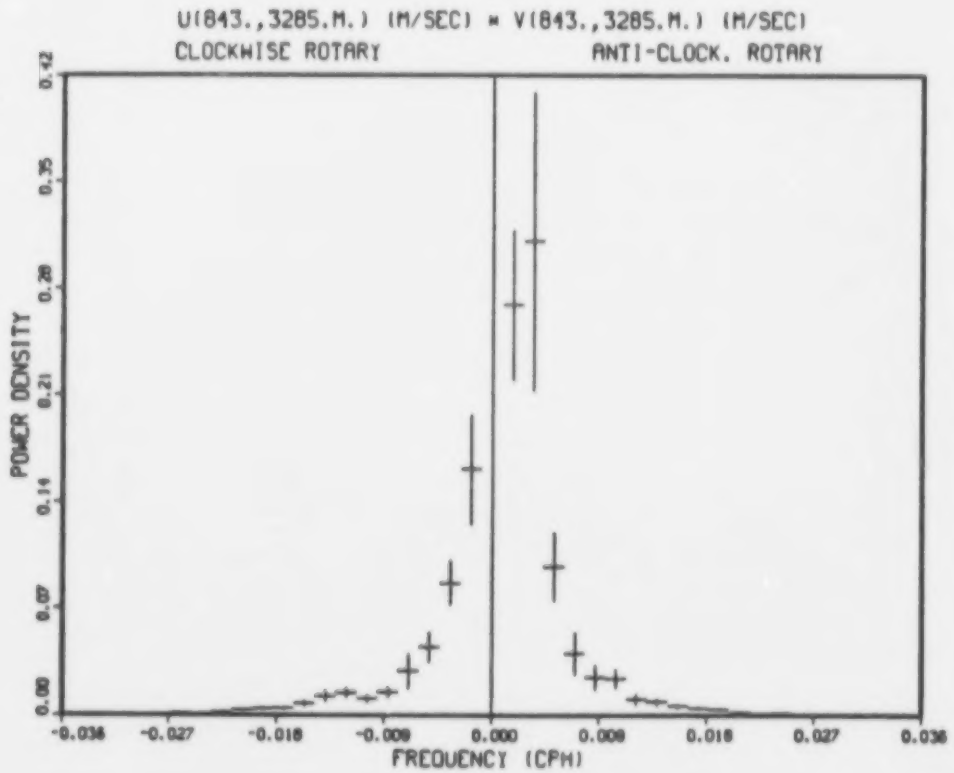
CM(843;3285.M.) - RESIDUAL STATISTICS

POSITION 56.015 N 52.901 W
BOTTOM DEPTH 3300.0 M
DURATION 368.3 DAYS

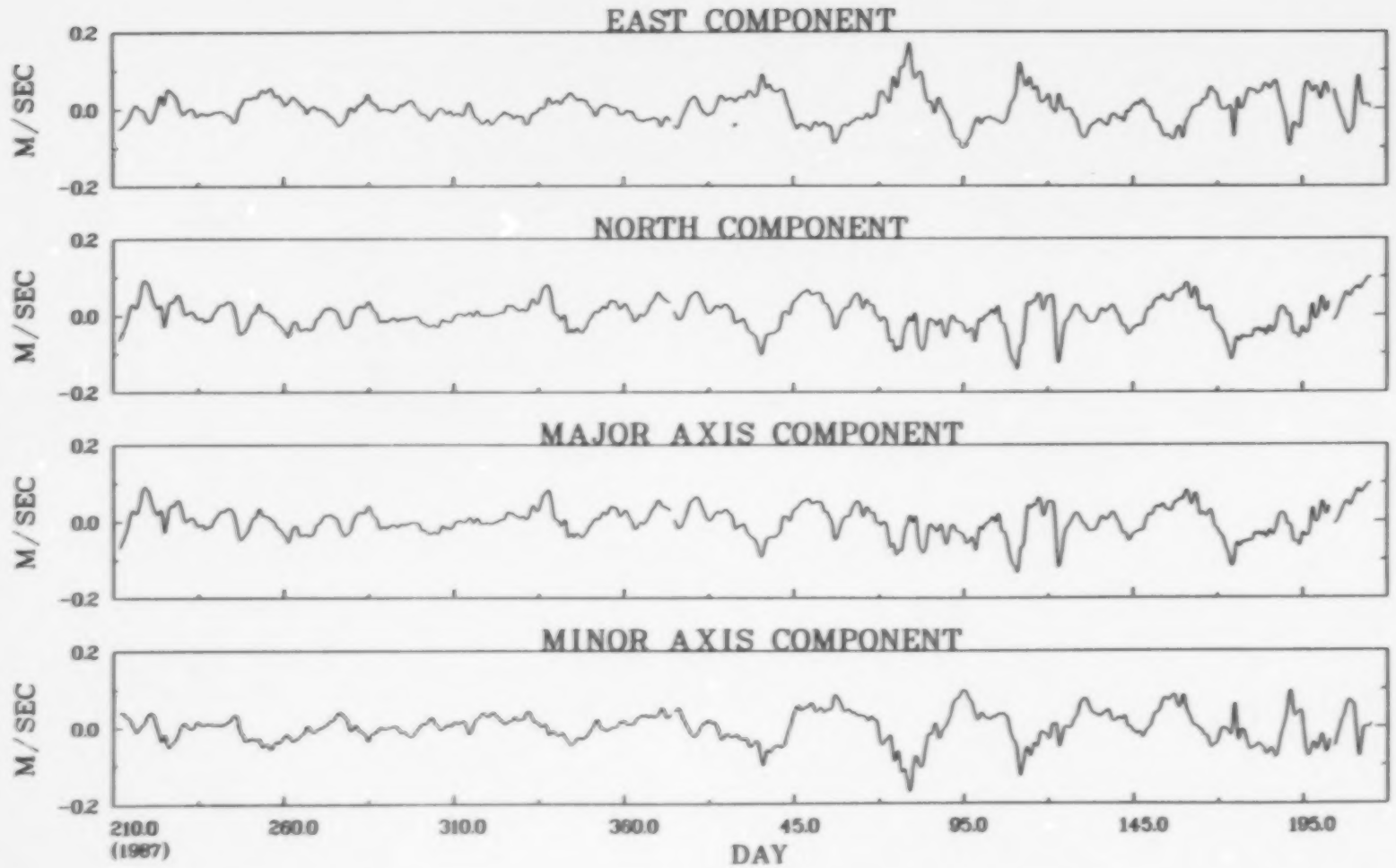
		MINIMUM	MAXIMUM	MEAN	STD. DEV.
TEMPERATURE	DEG C	1.51	1.82	1.66	.04
N-S COMPONENT	M/S	-.18	.06	-.04	.04
E-W COMPONENT	M/S	-.04	.24	.06	.04
MAJOR AXIS	M/S	-.17	.07	-.03	.04
MINOR AXIS	M/S	-.24	.03	-.07	.04

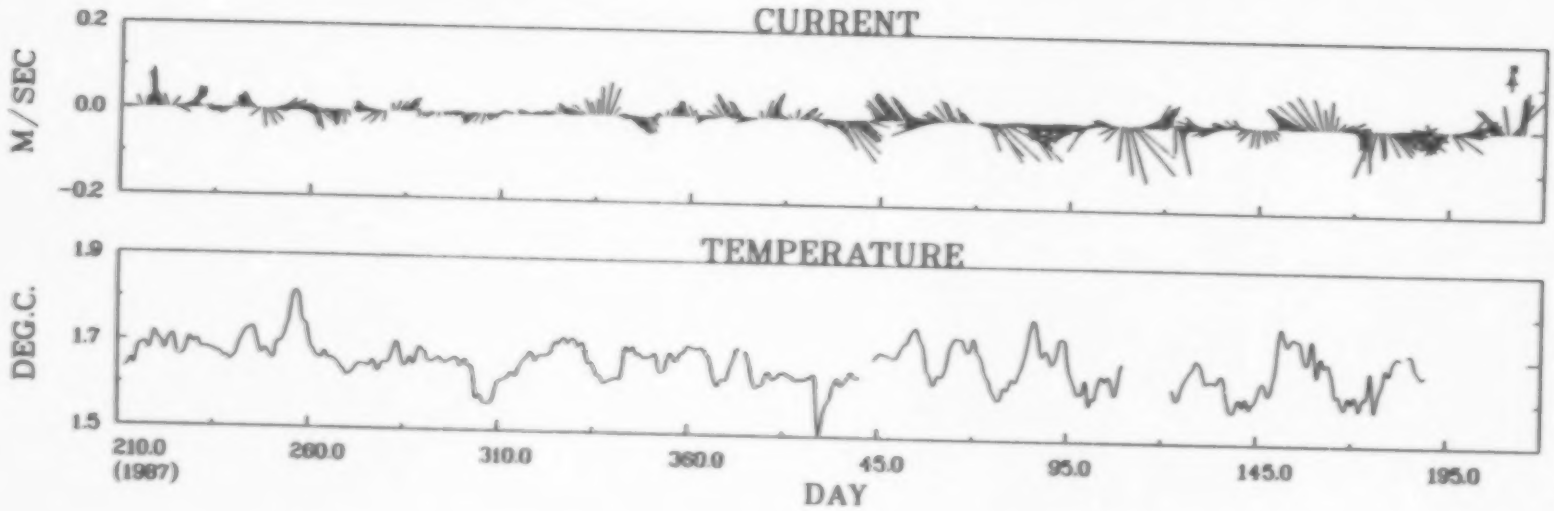
MAJOR AXIS ORIENTATION -83.1 DEGREES TRUE

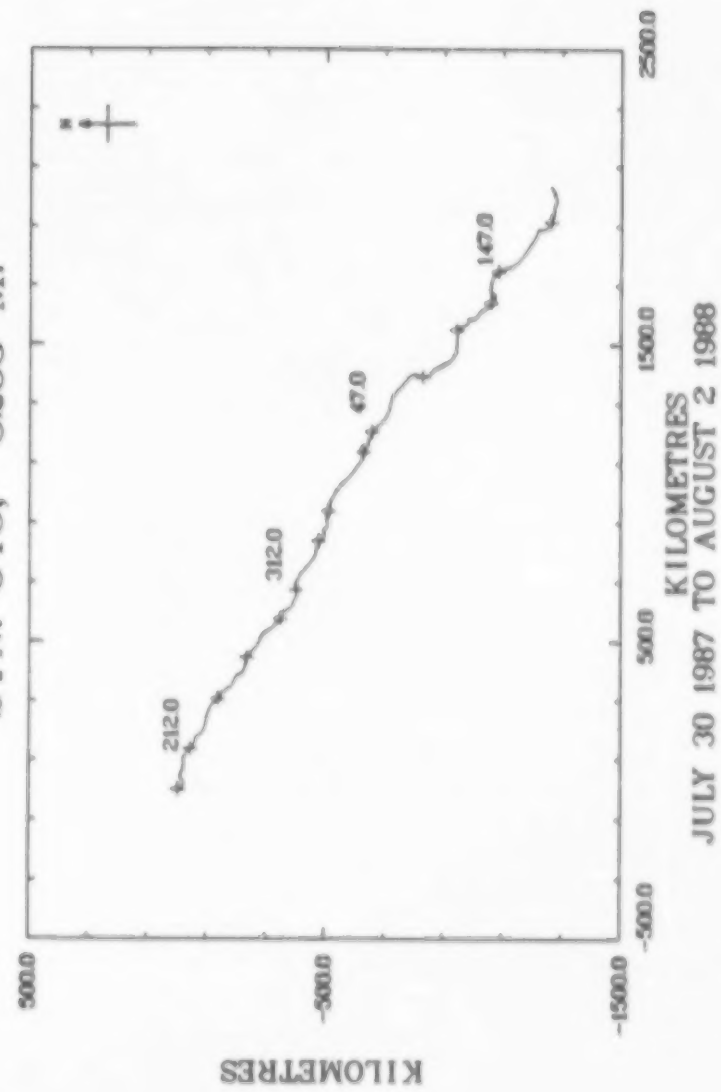
ROTARY SPECTRUM OF TOTAL SIGNAL



CM(843;3285M) - RESIDUALS
POSITION 56.015 N 52.901 W




CURRENT
M/SEC
0.2
0.0
-0.2
TEMPERATURE
DEG.C.
1.9
1.7
1.5
210.0
(1987)
260.0
310.0
360.0
45.0
95.0
145.0
195.0
DAY


STN. 843, 3285 M.
2120
3120
67.0
147.0
500.0
-500.0
-1500.0
-500.0
500.0
1500.0
2500.0
KILOMETRES
KILOMETRES
JULY 30 1987 TO AUGUST 2 1988

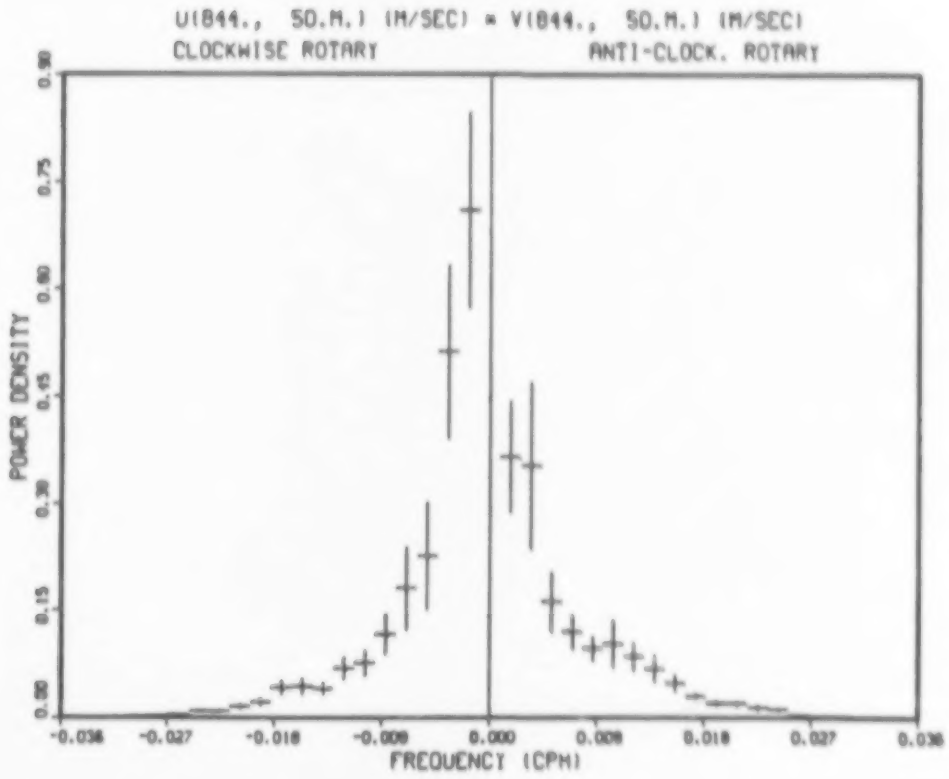
CM(844; 50.M.) - RESIDUAL STATISTICS

POSITION	56.957 N 51.588 W
BOTTOM DEPTH	3560.0 M
DURATION	368.3 DAYS

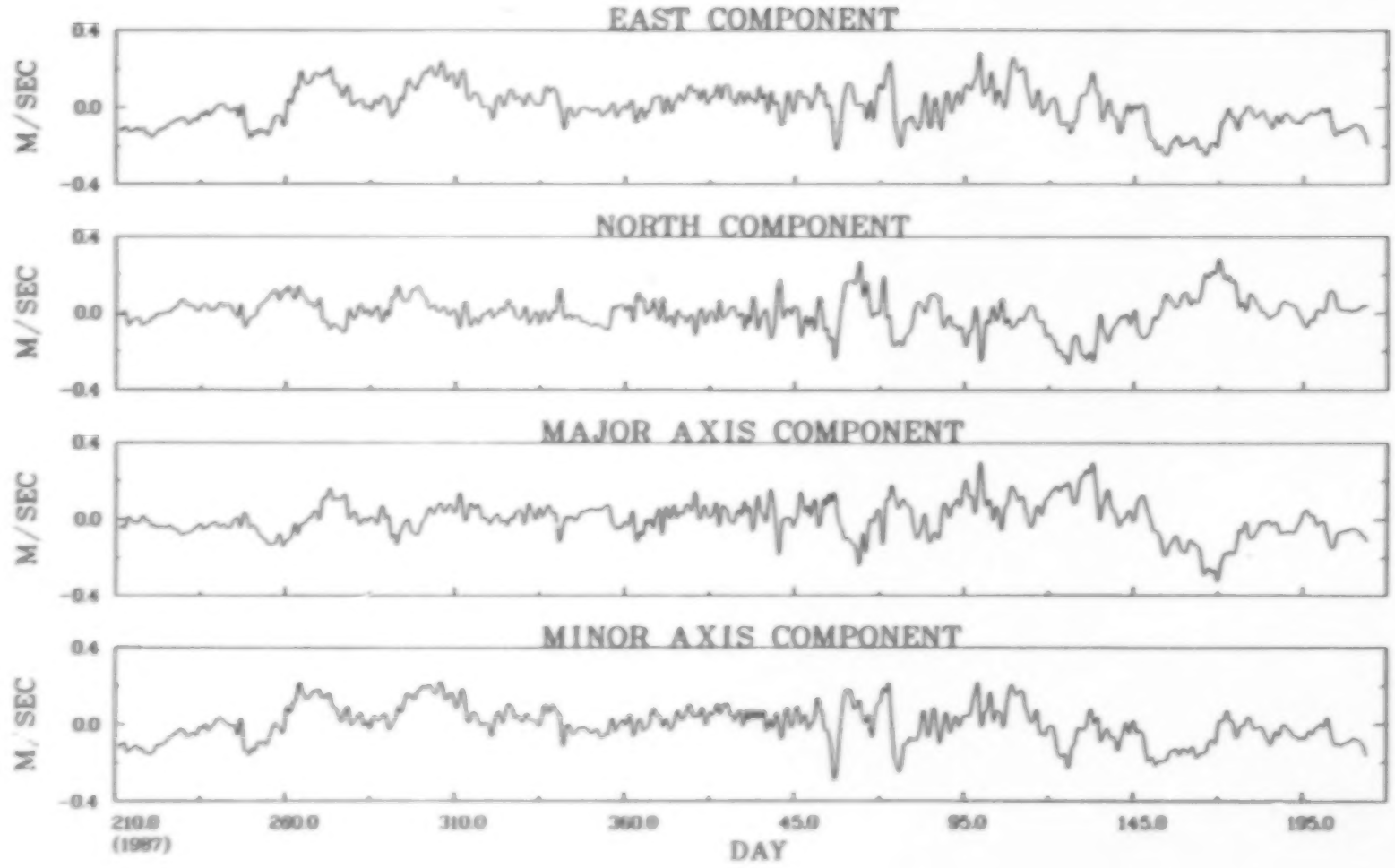
		MINIMUM	MAXIMUM	MEAN	STD. DEV.
TEMPERATURE	DEG C	2.43	7.65	3.81	1.22
SALINITY		34.46	35.41	34.83	.18
SIGMA-THETA	KG/M**3	26.95	28.21	27.66	.26
N-S COMPONENT	M/S	-.30	.26	-.03	.08
E-W COMPONENT	M/S	-.19	.34	.06	.10
MAJOR AXIS	M/S	-.28	.35	.05	.09
MINOR AXIS	M/S	-.25	.26	.04	.09

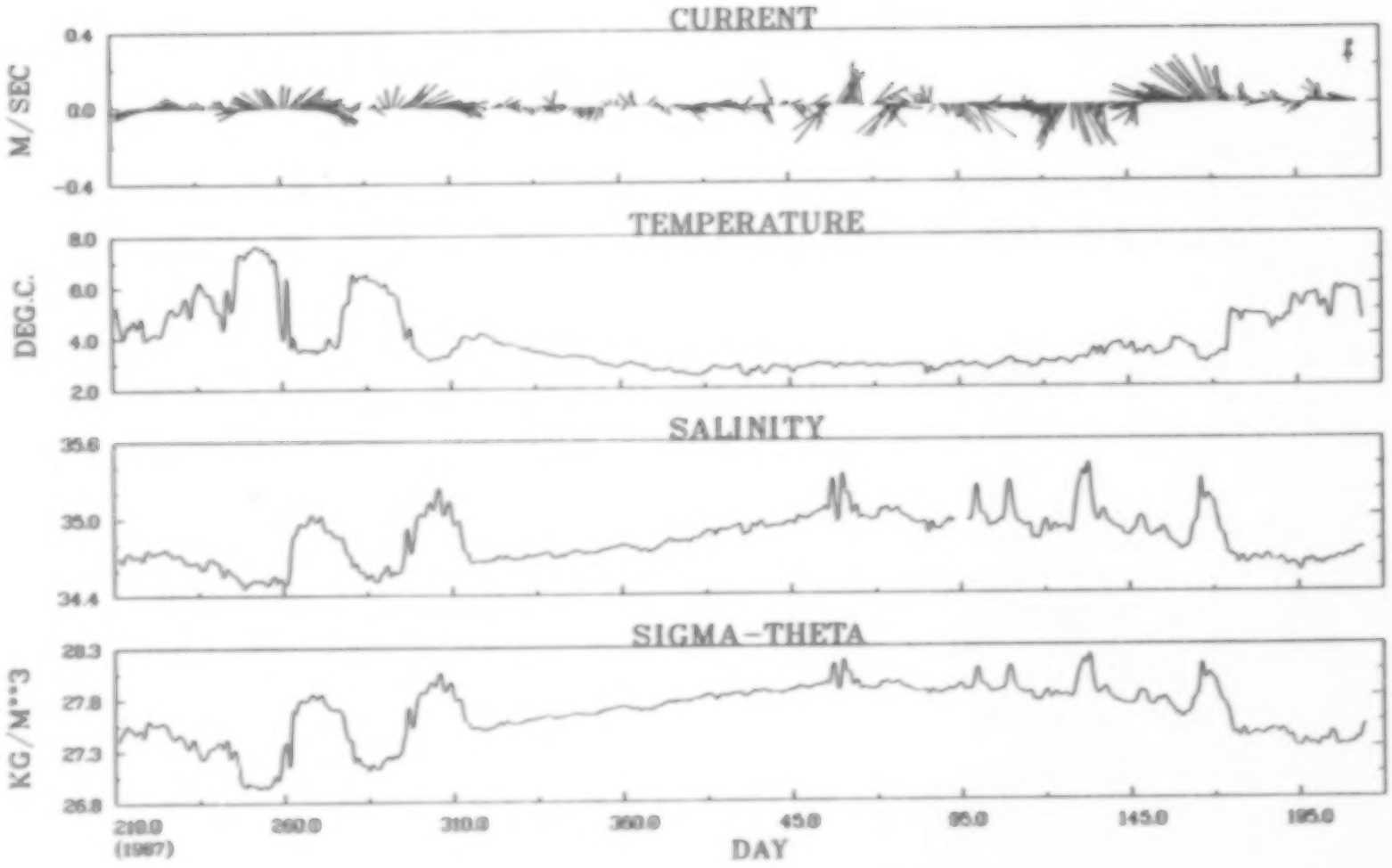
MAJOR AXIS ORIENTATION 66.7 DEGREES TRUE

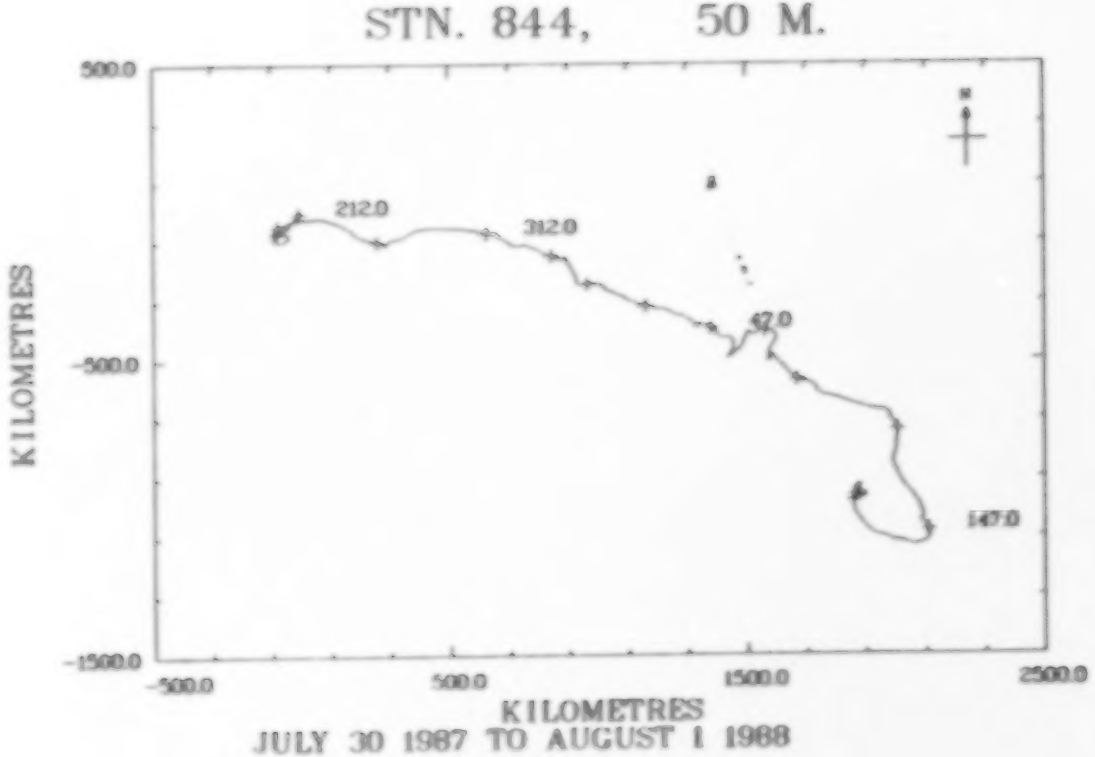
ROTARY SPECTRUM OF TOTAL SIGNAL



CM(844; 50M) - RESIDUALS
POSITION 56.957 N 51.588 W




CURRENT
M/SEC
0.4
0.0
-0.4
TEMPERATURE
DEG.C.
8.0
6.0
4.0
2.0
SALINITY
35.6
35.0
34.4
SIGMA-THETA
KG/M**3
28.3
27.8
27.3
26.8
210.0
(1987)
260.0
310.0
360.0
45.0
95.0
145.0
195.0
DAY


STN. 844, 50 M.
500.0
-500.0
-1500.0
-500.0
500.0
1500.0
2500.0
212.0
312.0
47.0
147.0
KILOMETRES
KILOMETRES
JULY 30 1987 TO AUGUST 1 1988

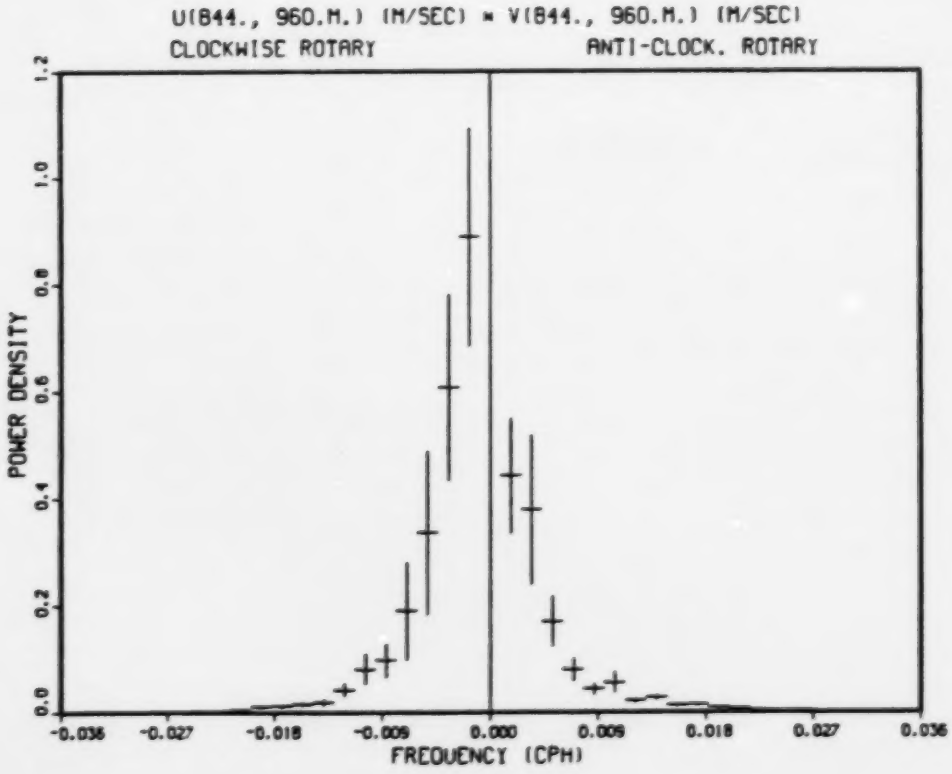
CM(844; 960.M.) - RESIDUAL STATISTICS

POSITION 56.957 N 51.588 W
BOTTOM DEPTH 3560.0 M
DURATION 368.3 DAYS

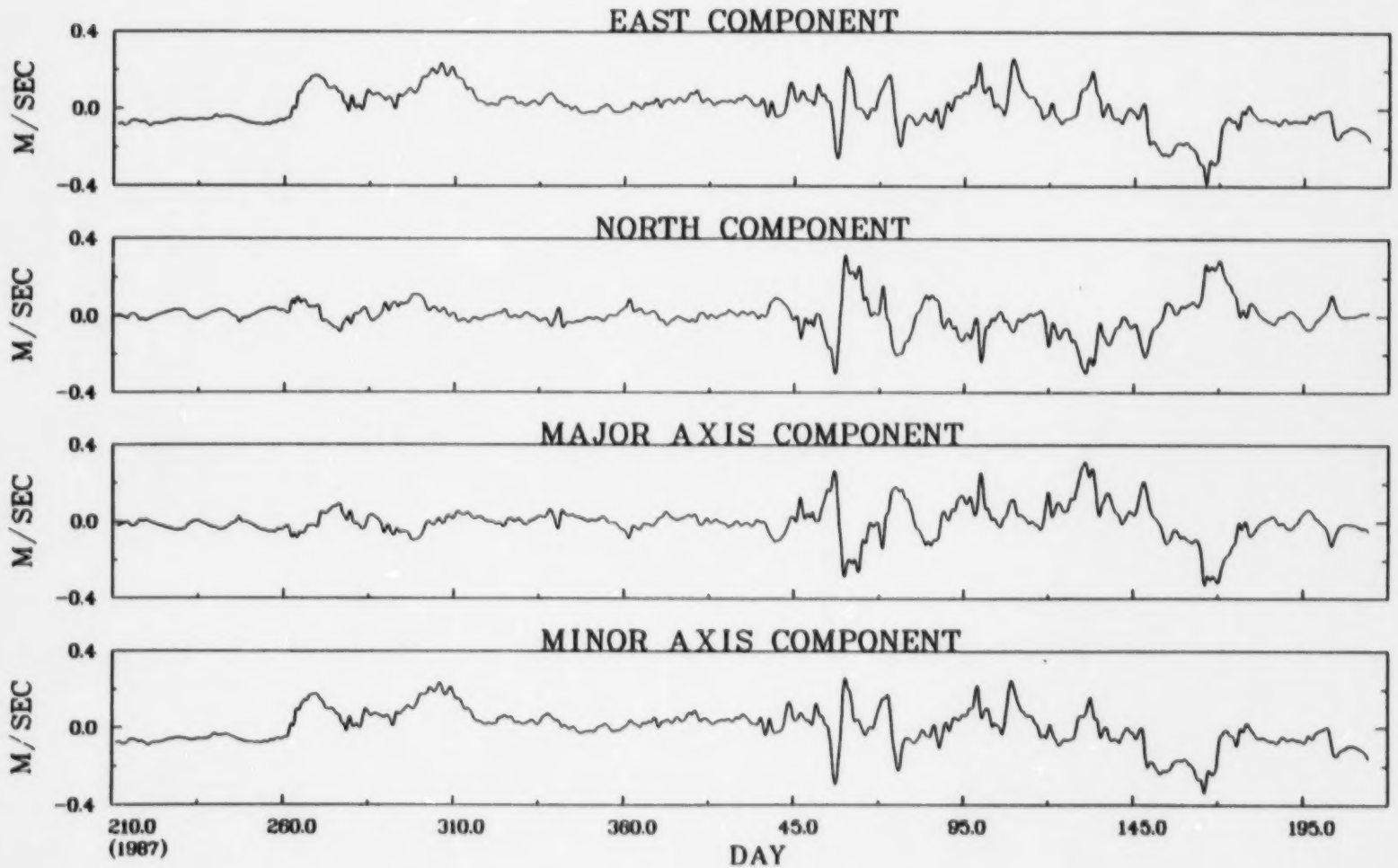
		MINIMUM	MAXIMUM	MEAN	STD. DEV.
TEMPERATURE	DEG C	2.88	3.39	3.15	.07
SALINITY		34.80	35.17	34.89	.04
SIGMA-THETA	KG/M**3	27.71	28.02	27.79	.04
N-S COMPONENT	M/S	-.32	.30	-.02	.08
E-W COMPONENT	M/S	-.33	.32	.06	.10
MAJOR AXIS	M/S	-.31	.34	.03	.08
MINOR AXIS	M/S	-.28	.32	.06	.09

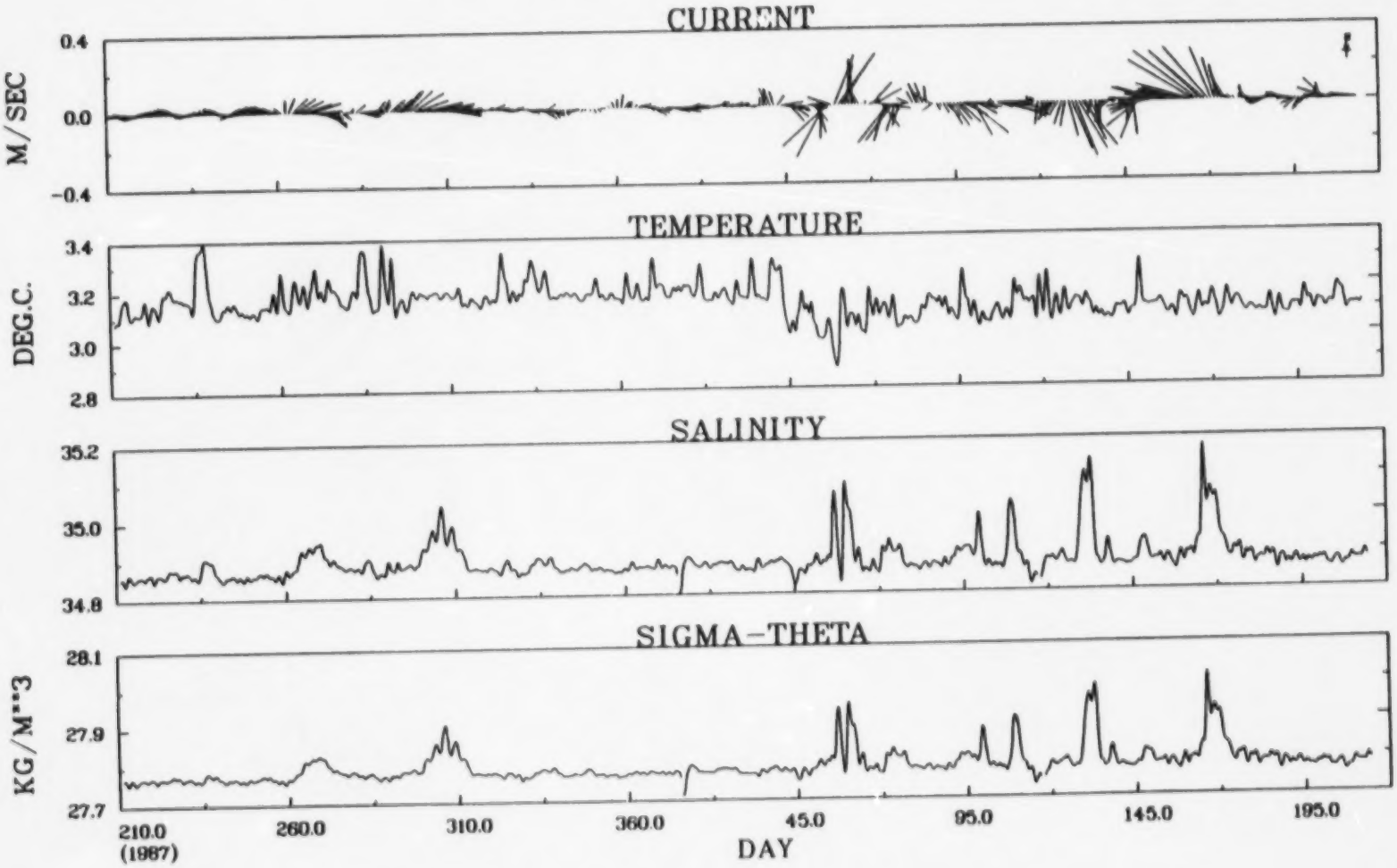
MAJOR AXIS ORIENTATION 80.9 DEGREES TRUE

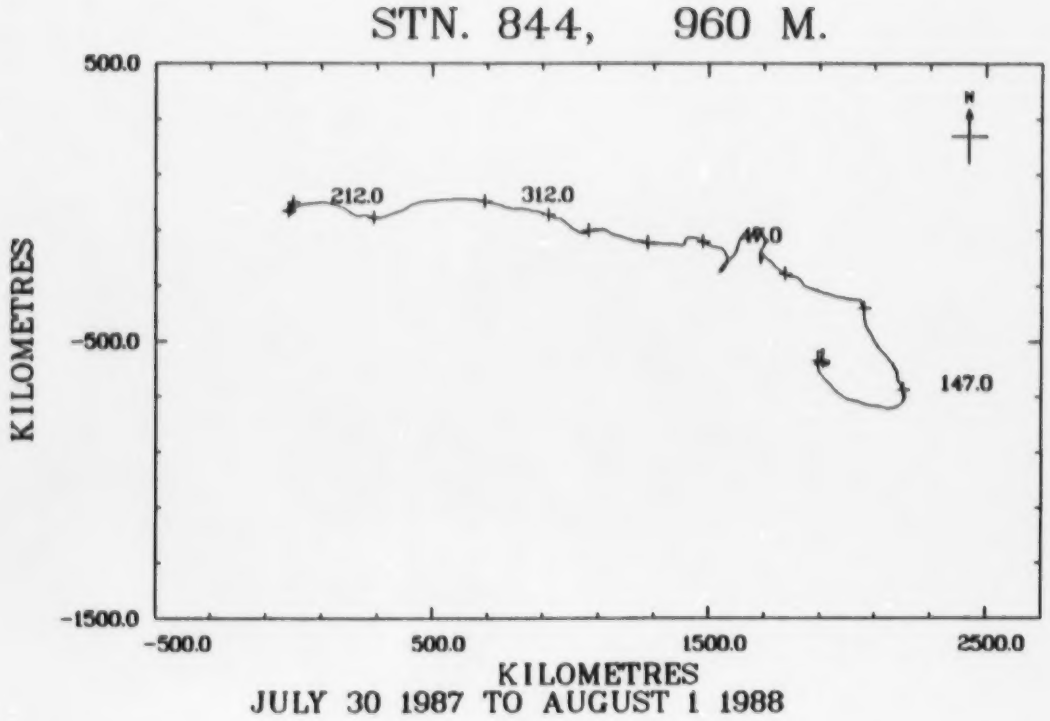
ROTARY SPECTRUM OF TOTAL SIGNAL



CM(844; 960M) - RESIDUALS
POSITION 56.957 N 51.588 W




CURRENT
0.4
0.0
-0.4
M/SEC
TEMPERATURE
3.4
3.2
3.0
2.8
DEG.C.
SALINITY
35.2
35.0
34.8
SIGMA-THETA
28.1
27.9
27.7
KG/M**3
210.0
(1987)
260.0
310.0
360.0
45.0
95.0
145.0
195.0
DAY


STN. 844, 960 M.
500.0
-500.0
-1500.0
KILOMETRES
212.0
312.0
147.0
N
-500.0
500.0
1500.0
2500.0
KILOMETRES
JULY 30 1987 TO AUGUST 1 1988

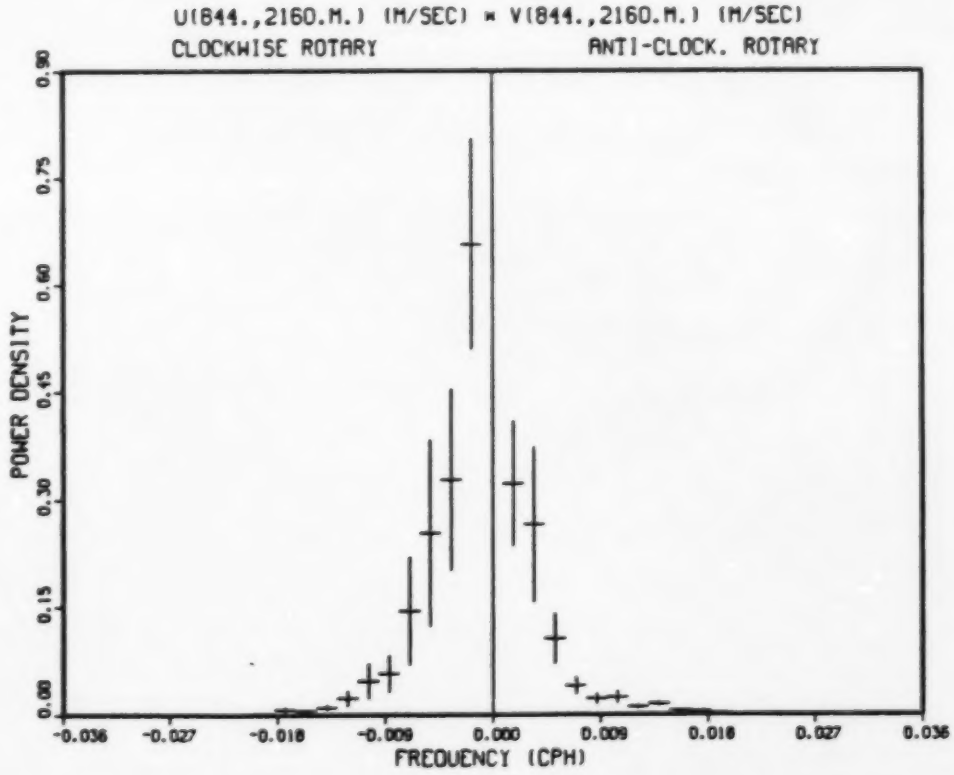
CM(844;2160.M.) - RESIDUAL STATISTICS

POSITION	56.957 N 51.588 W
BOTTOM DEPTH	3560.0 M
DURATION	321.3 DAYS

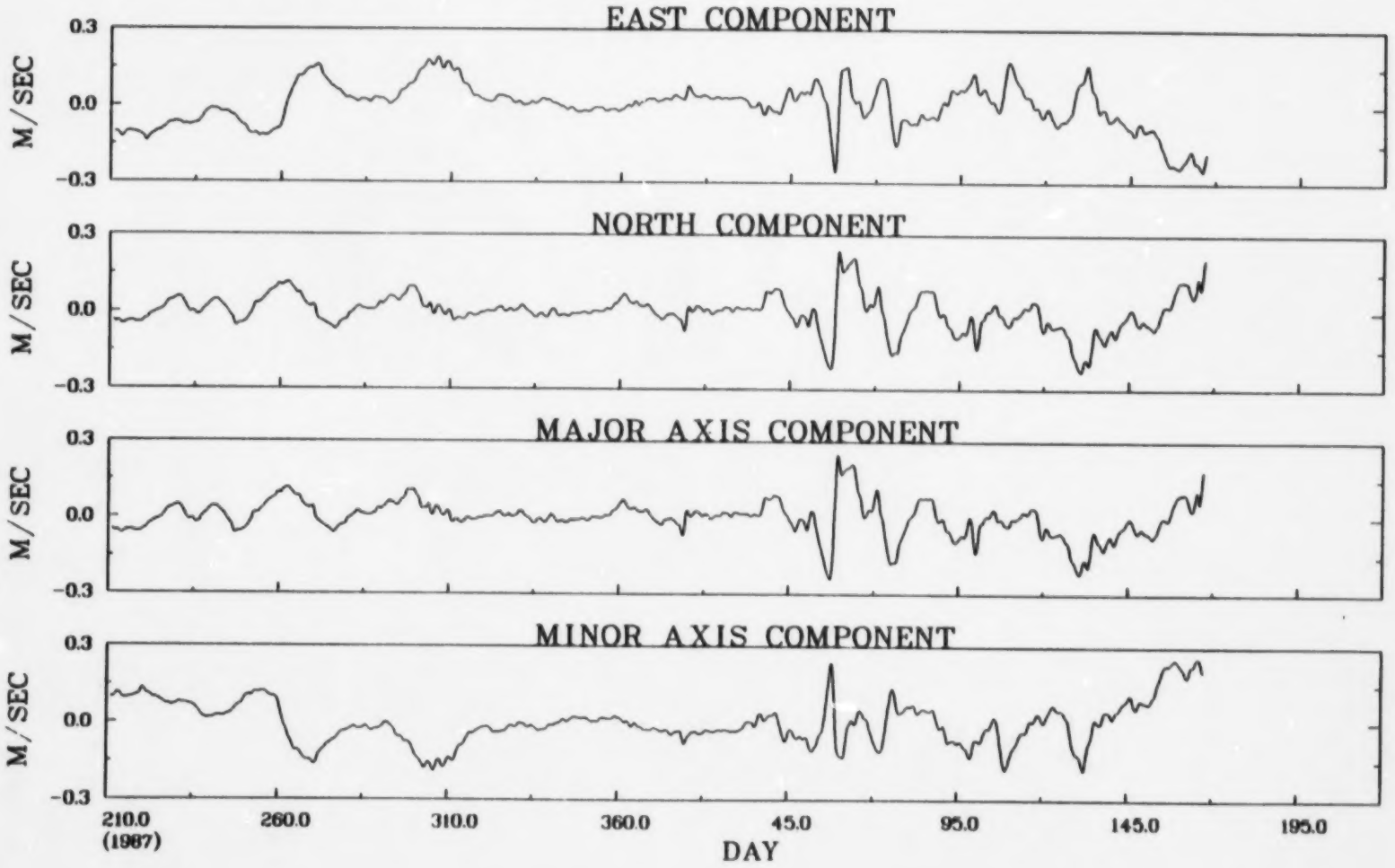
		MINIMUM	MAXIMUM	MEAN	STD. DEV.
TEMPERATURE	DEG C	2.92	3.42	3.36	.04
N-S COMPONENT	M/S	-.26	.21	-.03	.07
E-W COMPONENT	M/S	-.20	.25	.06	.08
MAJOR AXIS	M/S	-.26	.23	-.02	.07
MINOR AXIS	M/S	-.25	.20	-.06	.09

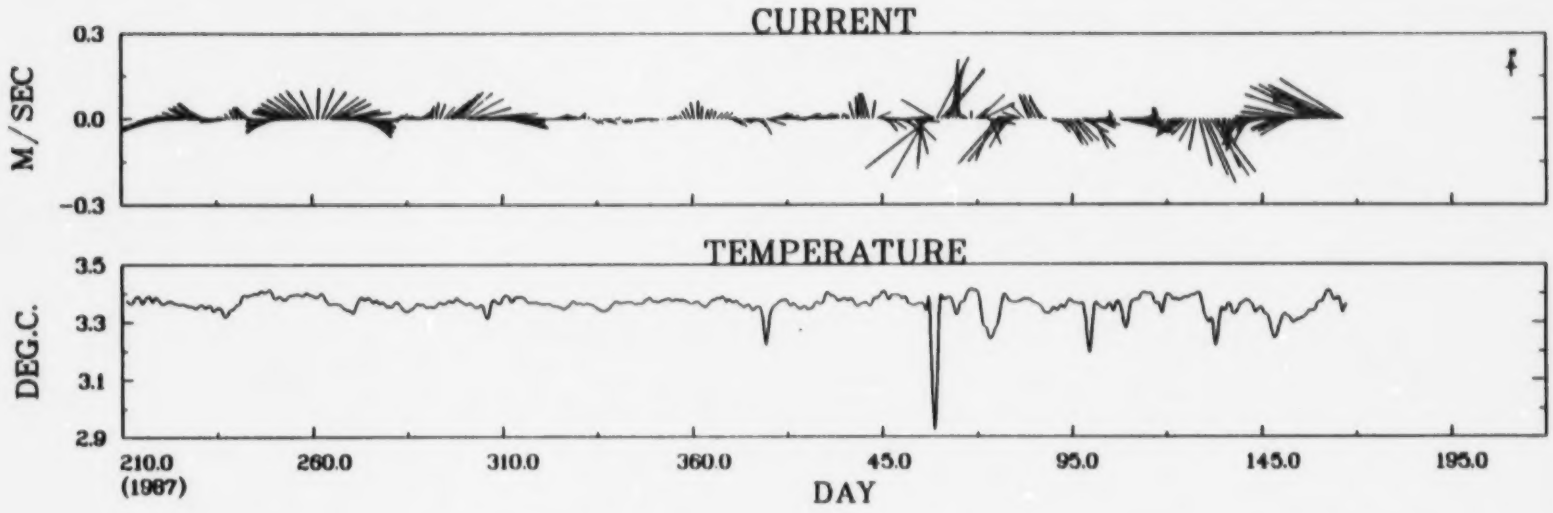
MAJOR AXIS ORIENTATION -83.3 DEGREES TRUE

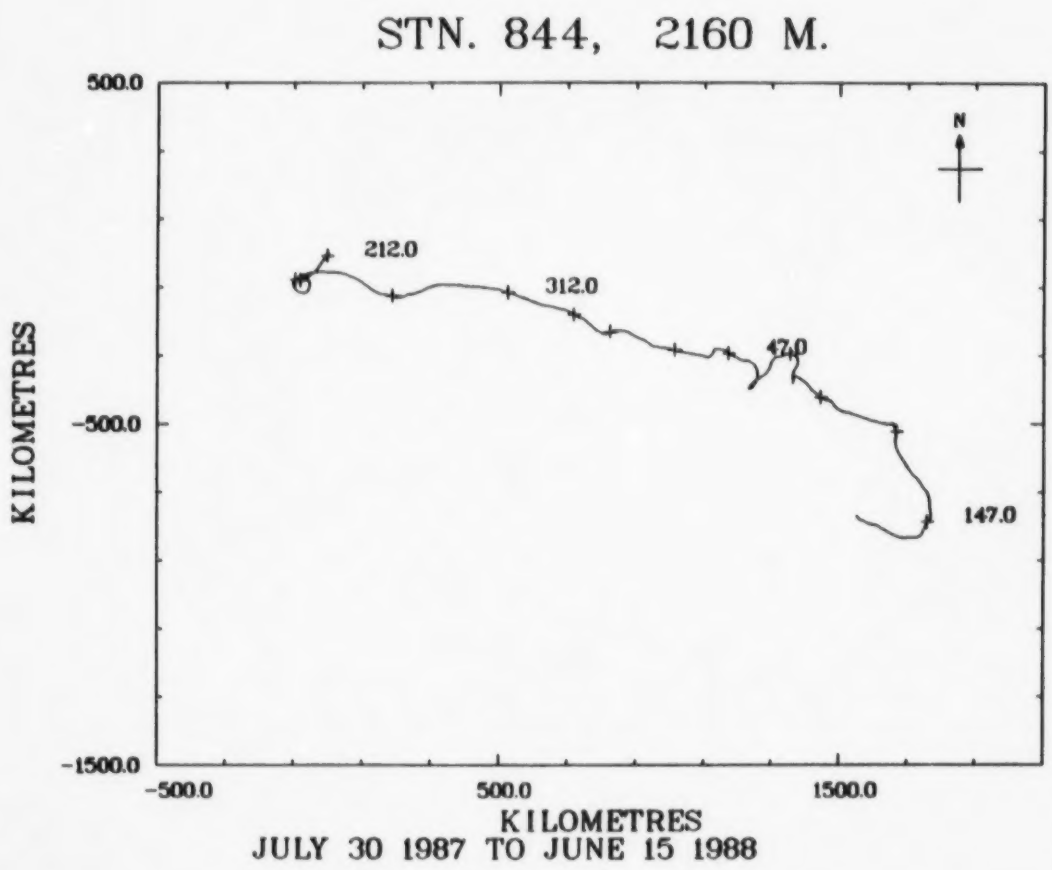
ROTARY SPECTRUM OF TOTAL SIGNAL



CM(844;2160M) - RESIDUALS
POSITION 56.957 N 51.588 W




CURRENT
0.3
0.0
-0.3
M./SEC
TEMPERATURE
3.5
3.3
3.1
2.9
DEG.C.
210.0
(1987)
260.0
310.0
360.0
45.0
95.0
145.0
195.0
DAY


STN. 844, 2160 M.
500.0
-500.0
-1500.0
KILOMETRES
N
212.0
312.0
47.0
147.0
-500.0
500.0
1500.0
KILOMETRES
JULY 30 1987 TO JUNE 15 1988

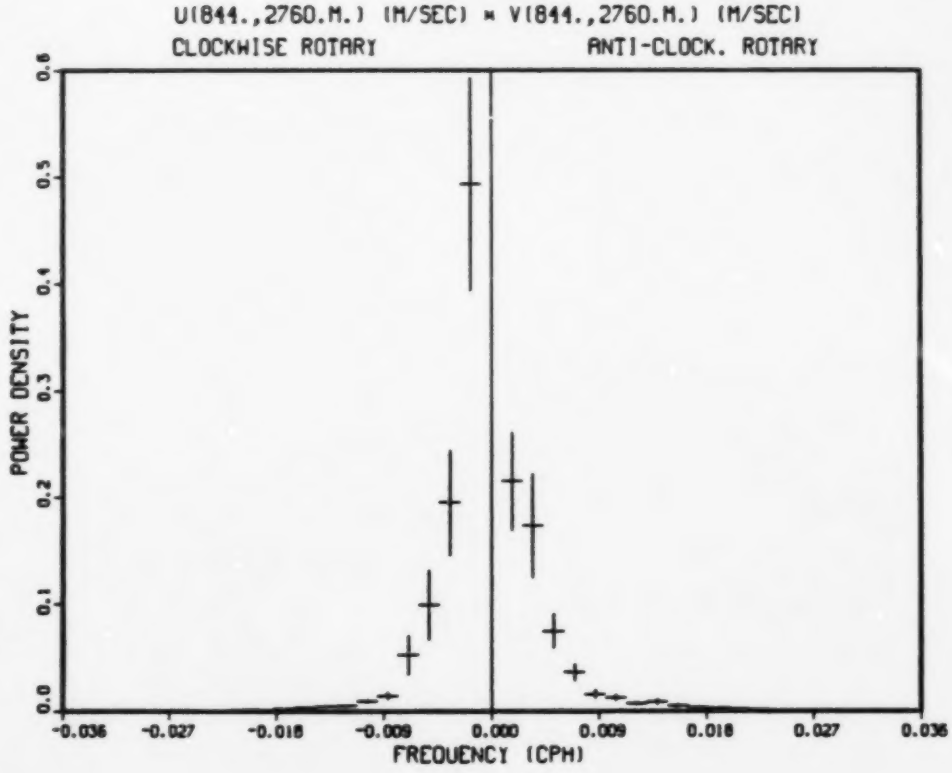
CM(844;2760.M.) - RESIDUAL STATISTICS

POSITION 56.957 N 51.588 W
BOTTOM DEPTH 3560.0 M
DURATION 368.3 DAYS

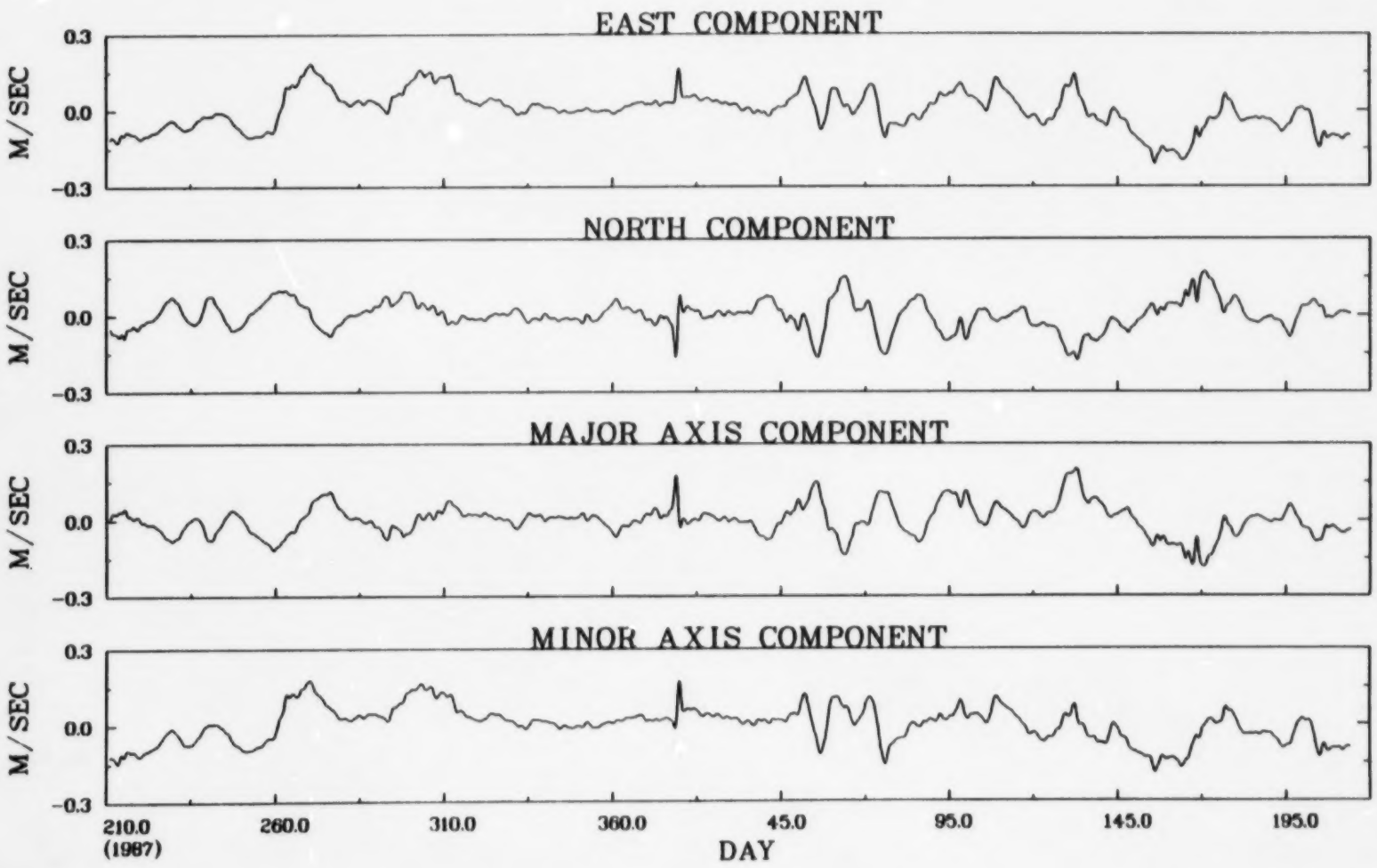
		MINIMUM	MAXIMUM	MEAN	STD. DEV.
TEMPERATURE	DEG C	2.80	3.18	2.94	.03
N-S COMPONENT	M/S	-.20	.15	-.02	.06
E-W COMPONENT	M/S	-.17	.23	.05	.07
MAJOR AXIS	M/S	-.15	.24	.04	.06
MINOR AXIS	M/S	-.16	.22	.04	.07

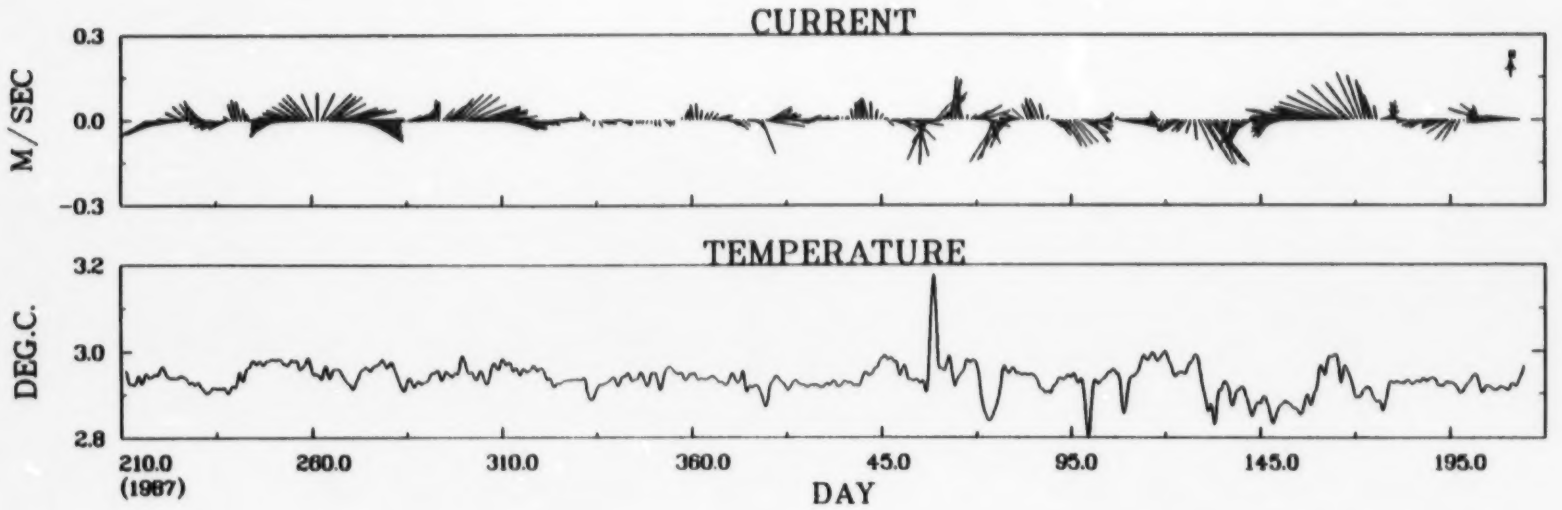
MAJOR AXIS ORIENTATION 69.4 DEGREES TRUE

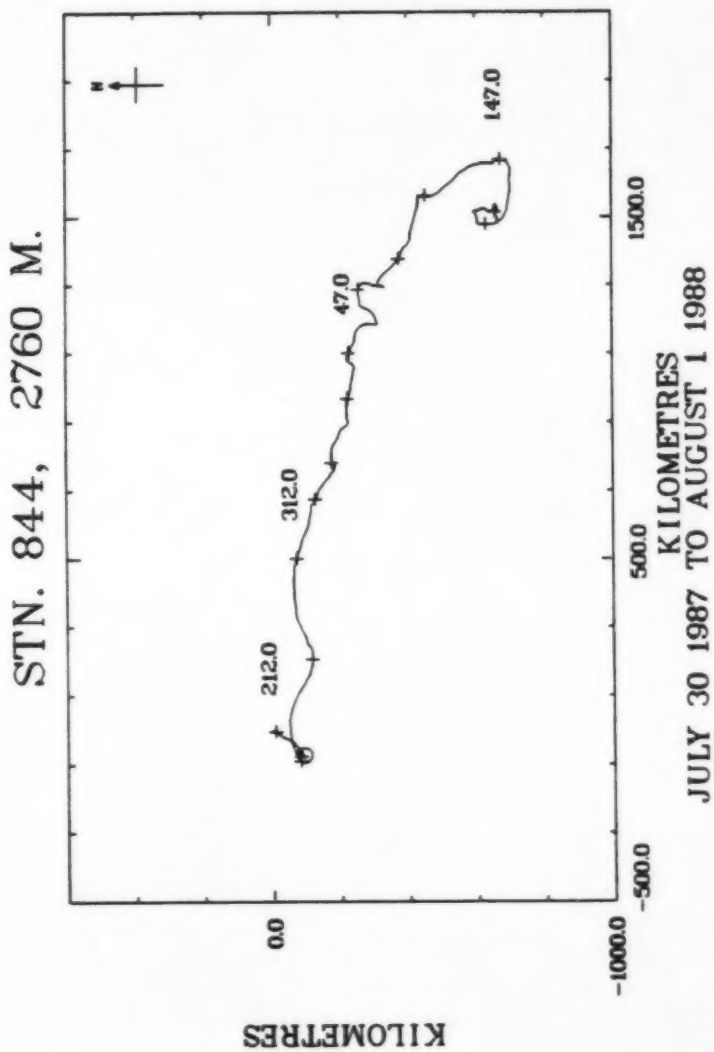
ROTARY SPECTRUM OF TOTAL SIGNAL



CM(844;2760M) - RESIDUALS
POSITION 56.957 N 51.588 W




CURRENT
0.3
0.0
-0.3
M/SEC
TEMPERATURE
3.2
3.0
2.8
DEG.C.
210.0
(1987)
260.0
310.0
360.0
45.0
95.0
145.0
195.0
DAY


STN. 844, 2760 M.
212.0
312.0
47.0
147.0
0.0
-1000.0
-500.0
500.0
1500.0
KILOMETRES
KILOMETRES
JULY 30 1987 TO AUGUST 1 1988

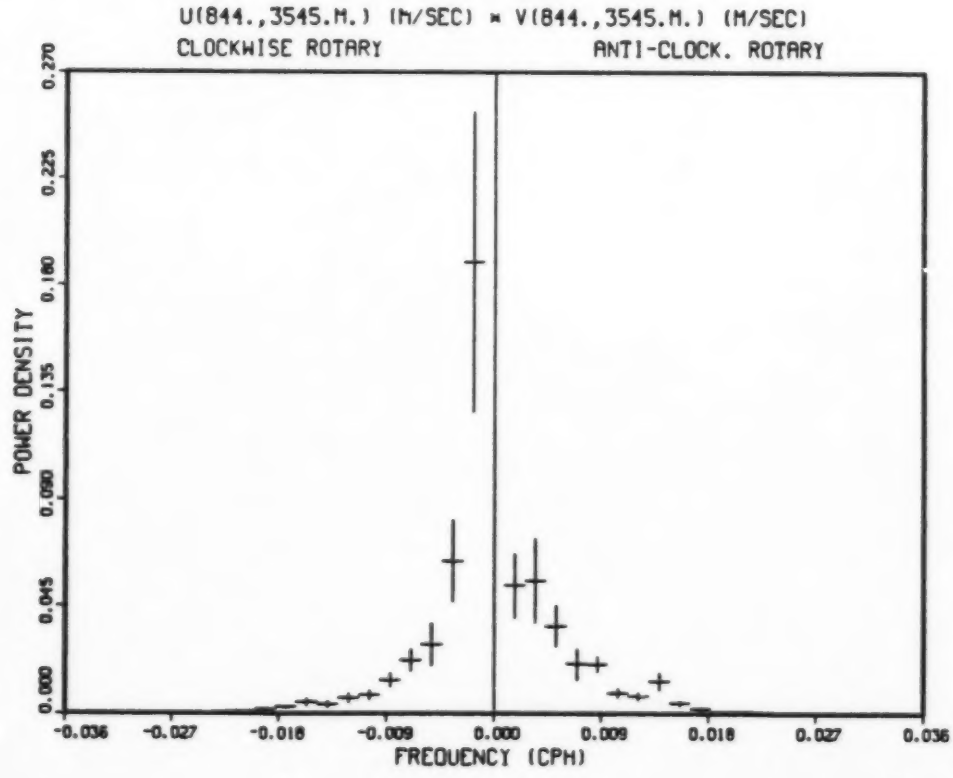
CM(844;3545.M.) - RESIDUAL STATISTICS

POSITION 56.957 N 51.588 W
BOTTOM DEPTH 3560.0 M
DURATION 202.0 DAYS

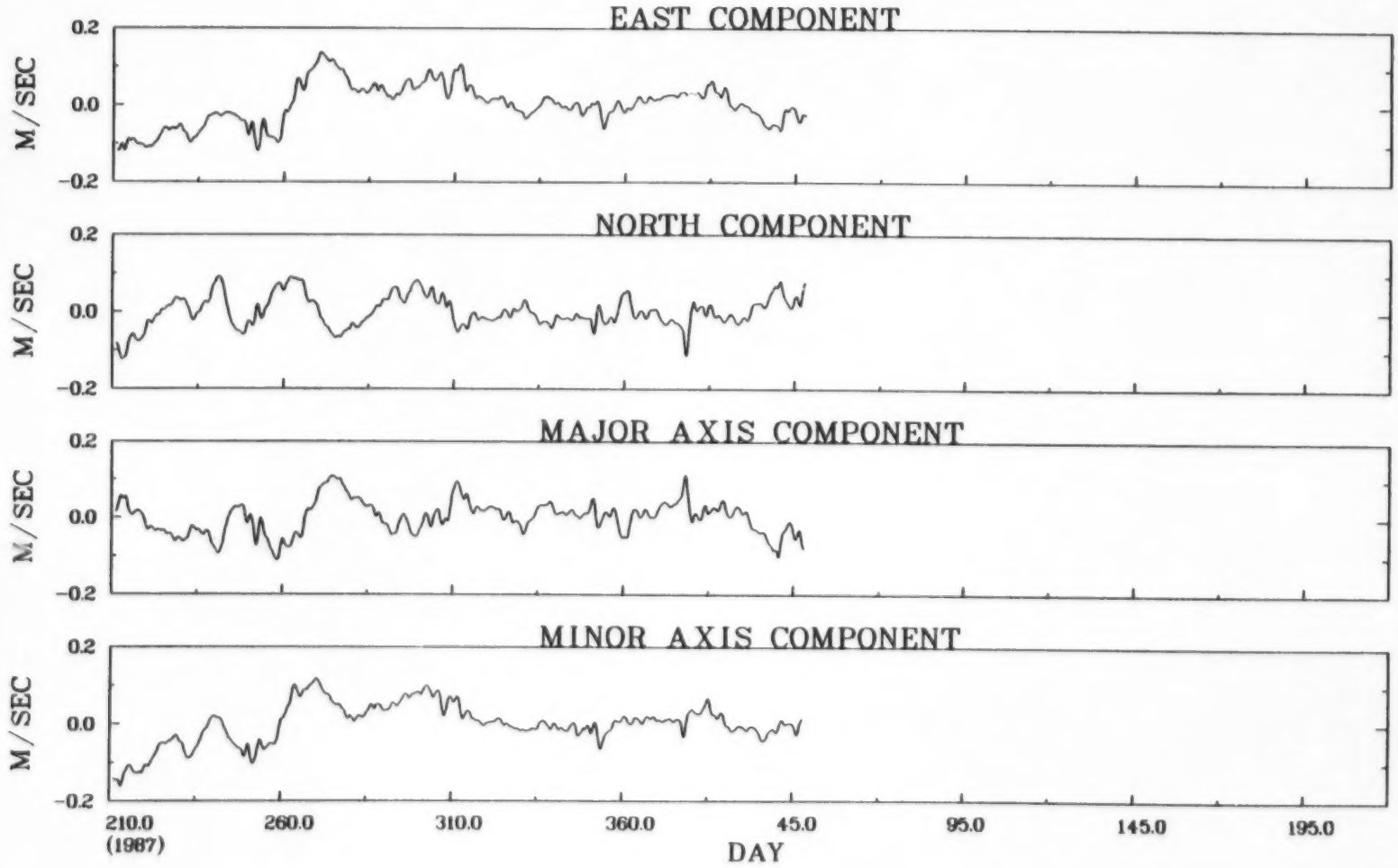
		MINIMUM	MAXIMUM	MEAN	STD. DEV.
TEMPERATURE	DEG C	1.39	1.78	1.59	.07
N-S COMPONENT	M/S	-.15	.06	-.03	.04
E-W COMPONENT	M/S	-.06	.19	.06	.05
MAJOR AXIS	M/S	-.06	.16	.05	.04
MINOR AXIS	M/S	-.13	.15	.03	.05

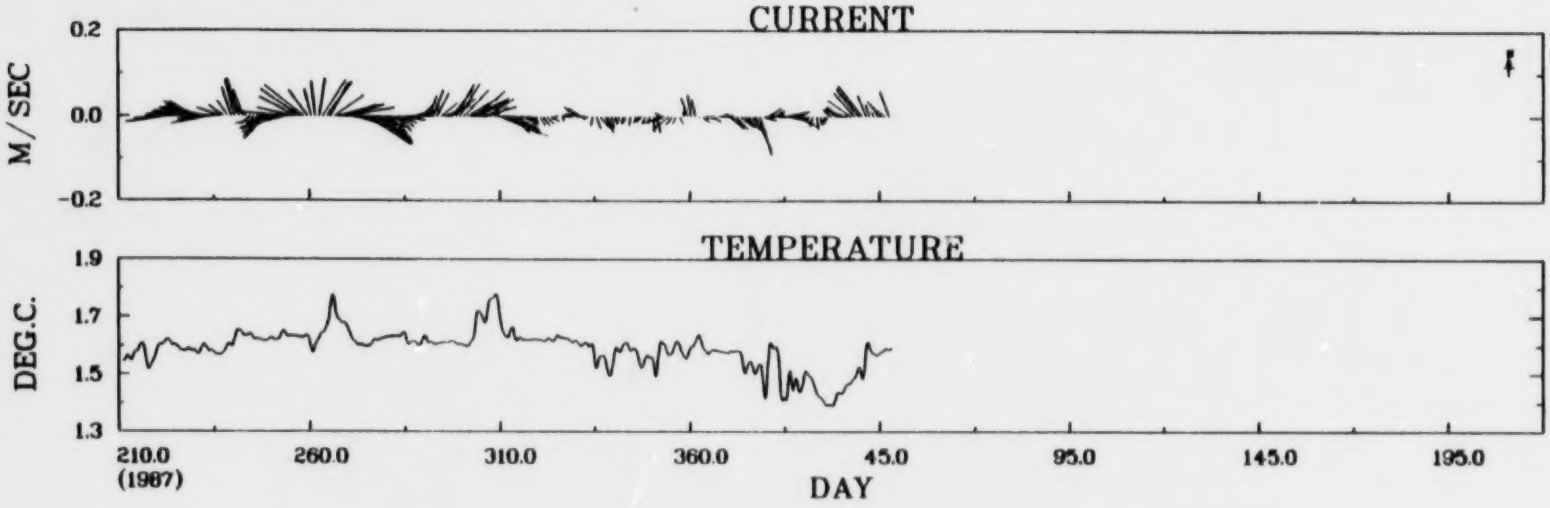
MAJOR AXIS ORIENTATION 61.5 DEGREES TRUE

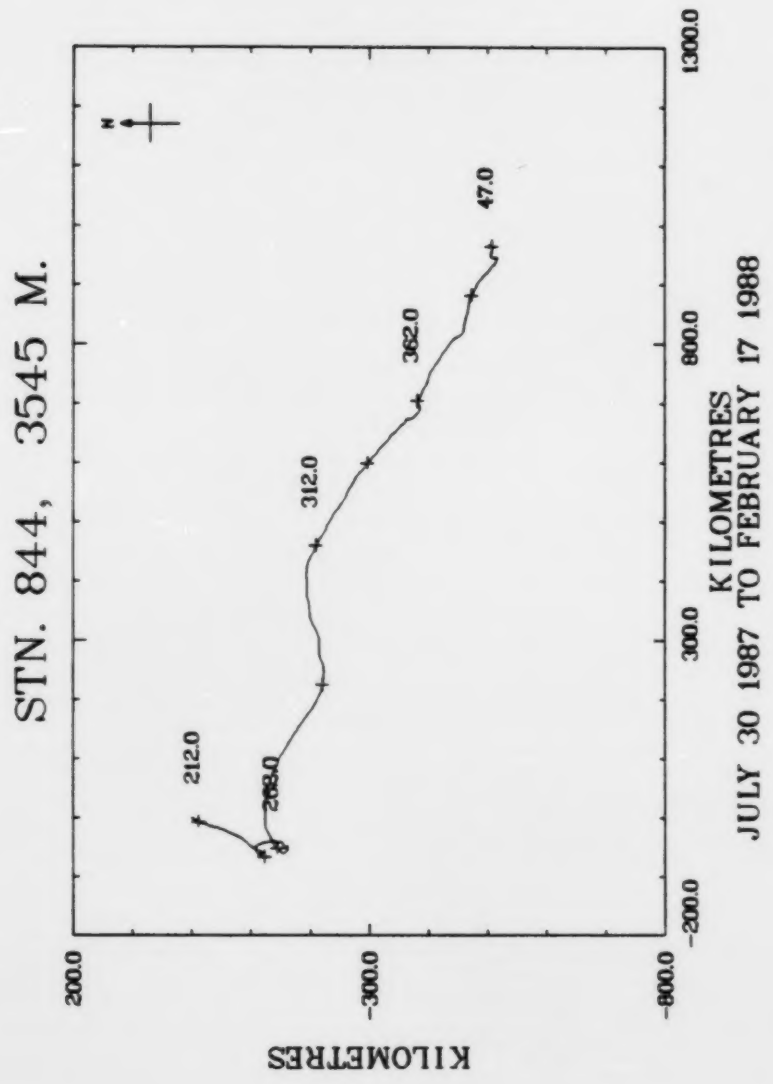
ROTARY SPECTRUM OF TOTAL SIGNAL



CM(844;3545M) - RESIDUALS
POSITION 56.957 N 51.588 W




CURRENT
0.2
0.0
-0.2
M/SEC
TEMPERATURE
1.9
1.7
1.5
1.3
DEG.C.
210.0
(1987)
260.0
310.0
360.0
45.0
95.0
145.0
195.0
DAY


STN. 844, 3545 M.
212.0
268.0
312.0
362.0
47.0
N
200.0
-300.0
-800.0
-200.0
300.0
800.0
1300.0
KILOMETRES
KILOMETRES
JULY 30 1987 TO FEBRUARY 17 1988